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DISEASES CAUSED BY BACTERIA AND FUNGI.

I. GIBSON, H. J., & MUIR, R. O. (1935). **A Study of the Streptococci from Fifty Cases of Bovine Mastitis.**—*J. Hyg., Camb.* **35.** 238-254. [21 refs.]

II. MINETT, F. C. (1935). **The Bacteriology of Bovine Streptococcus Mastitis.** —*Ibid.* 504-511. [31 refs.]

I. Fifty-one strains of streptococci were isolated from the purulent secretion of the udders from 50 cows immediately after death of the animals. Comparison was made with streptococci from human and from certain bovine sources, including representative cultures of *Str. agalactiae*, the organism responsible for the prevalent chronic form of the disease. Strains were primarily subdivided on the basis of haemolytic characters in ox-blood agar and were then classified according to the method of HOLMAN. The result was that no two of the 51 strains were found to be alike in every respect. Owing to this diversity, differentiation of mastitis streptococci from streptococci of human origin is regarded as precarious.

II. This article is in the nature of a criticism of the work described in I. A short review, accompanied by references to the literature, is given of the present position of the bacteriology of bovine mastitis and of its bearing upon clinical and epizootiological data. GIBSON and MUIR are in error in regarding bovine streptococcus mastitis as " a single clinical condition ", and it is now becoming recognized that mastitis may be caused by streptococci belonging to different biochemical groups. The reality of these groups has been substantiated, not only by field observations but also by the serological work of STABLEFORTH.

The opportunity is taken to correct misrepresentations of the literature as shortly summarized by GIBSON and MUIR.

HOPKIRK, C. S. M. (1935). **Bovine Contagious Mastitis : Observations and Experiments in Connection with the Etiology, Diagnosis, Prophylaxis and Therapeutics.**—*Res. Rep. N.Z. Dep. Agric.* pp. 55. 18 tables. [Numerous refs.] [fcp] [Mimeographed].

This report embodies the text and some of the tables of a thesis, presented for a Doctorate in Veterinary Science from the Melbourne University.

Section 1 deals with the importance of the subject, showing the high incidence in New Zealand and other dairying countries, the aetiology as recognized by other

workers and the aetiology of the disease in New Zealand, together with a description of the organisms recovered (streptococci, staphylococci, micrococci, corynebacteria, *Brucella abortus* and the virus of vaccinia) and, finally, with a criticism of existing methods of diagnosis. It is stated that, in many herds, staphylococci are equally as prevalent in cases of mastitis as alpha streptococci, while micrococci and corynebacteria produce a mild catarrh which is unrecognizable except by microscopic examination. As means of diagnosis, indicator, chloride, catalase and cell sediment tests do not compare favourably with bacterial counts.

Therefore, in section 2 is given a new diagnostic test, based on the leucocyte assessment of cream of first milk which has stood for a certain time. Loops of such cream are smeared on slides, defatted, stained and examined for leucocytes. Results are shown to be comparable with plate counts and with types of organisms present. Assessment figures 0 to 6 are given, according to numbers of leucocytes per average field. It is claimed that perfectly normal heifers have practically no leucocytes in gravity cream.

The application of this diagnostic method of control of the disease is discussed in section 3. Cows are grouped in three sets, 0, 1 and 2 assessment figures being placed in group A – the clean group ; 3 and 4 in group B – the intermediate group, and 5 and 6 in group C – the definitely affected group. Cows are milked in order of grouping, and teats are disinfected after milking by immersion in any suitable fluid. Tables are given showing the results of the system over some three years.

Section 4 deals with experimental production of mastitis. All usual methods were tried and failed unless organisms had been placed directly in the milk reservoir. The method of infection by swab of the teat duct proved useful, however, as a means of producing infection and it is shown that organisms placed in the teat duct remained in that position, causing a positive chemiotaxis and that, if the conditions became favourable, mastitis developed at a later date. Damage to the teat orifice by vaccinia lesions, cuts, etc., were shown to be frequent sources of intractable cases of mastitis.

The experimental work with vaccines is outlined in section 5, and the claim is made that, in New Zealand, little benefit has accrued from their use.

In the manufacture of cheese, mastitis is shown, in section 6, to reduce the firmness of curd and to produce a cheese which easily cracks in the rind during maturing, the result probably of excess moisture held in the curd. Analyses of vats of mastitis-infected milk are given and compared with normal vat milk.

—. (1935). Preussen. Runderlass des Reichs- und Preussischen Ministers des Innern, betr. Organisation und Durchführung der Galtbekämpfung. (Freiw. staatl. gefördertes Galtbekämpfungsverfahren). **[Prussia : Scheme for Voluntary Control of Mastitis]**.—*Reichsgesundheitsblatt.* **10.** 903. [1 ref.]

A voluntary scheme for the control of mastitis is outlined. [No new methods are recommended, but the report is of interest as a sign of the awakening to realization of the need for an active campaign against this disease].—E. J. P.

Tapernoux, A., & Nicolas, J. J. (1935). Les variations du taux des chlorures dans le lait au cours de l'évolution d'une mammite streptococcique. **[Variations in the Chloride Content of Milk in the Course of Streptococcal Mastitis]**.—*Rev. vét., Toulouse.* **87.** 624-629. [2 refs.]

This article concerns the chemical analysis of the milk from a ten-year-old cow in the early stages of streptococcal mastitis, the fluctuations of the chloride content being followed until recovery.

The findings support Tapernoux's theory [(1931). *Rev. vét., Toulouse.* **83.**

5.] that the chloride content (expressed as calcium chloride) of milk should not exceed 2 g. per litre (pathological or retained milk shows higher figures). One hind quarter was visibly affected – the form being subacute – but the other was proved to contain streptococci : the fore quarters were healthy. The hind quarters alone gave estimations of chloride above 0·2 per cent. Other chemical findings are embraced in the five tables of analyses, the whole being related to microscopic and bacteriological determinations carried out at the same time.—C. V. WATKINS.

SHAW, A. O., & BEAM, A. L. (1935). **The Effect of Mastitis upon Milk Production.**—*J. Dairy Sci.* **18.** 353-357. 4 tables. [9 refs.]

Shaw and Beam conclude that only a small variation exists between the milk yield, the percentage of butter fat and the total butter fat produced by opposite non-infected quarters (i.e. left and right fore quarters or left and right hind quarters) of a cow's udder, but that a considerable variation may be found between opposite mastitis-infected and non-infected quarters. After allowing for the maximum variation found between non-infected opposite quarters, there remained a reduction of 22 per cent. in milk yield and 24 per cent. in butter fat, which was apparently due to mastitis. The study was made on 18 healthy cows and on 86 which were infected in one quarter.—A. W. STABLEFORTH.

BREIDERT. (1935). Neue Richtlinien für die Galtbekämpfung. [**New Regulations for the Control of Streptococcal Mastitis, Germany**].—*Berl. tierärztl. Wschr.* **51.** 561-565. [13 refs.]

Being dissatisfied with the results obtained by "entozon" infusions, Breidert tested the value of infusions of 0·5 per cent. "weidnerit" solution [see this *Bull.* **5.** 398]. Although bacteriological examinations made soon afterwards showed a high percentage of apparent cures (60 to 80 or 90 per cent.) many quarters again showed infection at subsequent tests. Taking the view that in most cases these were new infections, strict measures were taken to clean and disinfect the floors, etc. (with " weidnerit " solution) and the hands of the milkers and teats of the cows with " weidnerit-gel " [see p. 371]. No protocols are given but it is stated that, by combining udder infusion with these measures, permanent success was obtained in 95 to 96 per cent. of cases, as the herds had remained free for more than a year at the time of the report. The remaining 4 to 5 per cent. of infected cows resisted treatment and were slaughtered. " Weidnerit " solution has a high bactericidal action on mastitis streptococci *in vitro* but is relatively non-irritant. Details are finally given of the author's method of infusion and general plan of attack.—A. W. STABLEFORTH.

PLASTRIDGE, W. N., ANDERSON, E. O., & WEIRETHER, F. J. (1935). **A Comparison of Methods of Detecting Streptococci in Freshly Drawn Milk Samples.**—*J. Dairy Sci.* **18.** 583-592. 5 tables. [12 refs.]

A comparison was made of the results obtained with 360 samples from individual quarters, of which 79 (21·9 per cent.) showed laboratory evidence of mastitis and of the presence of streptococci by one or more of the tests made. The authors conclude that microscopic examination of films, made after incubation of the samples overnight at 37°C., revealed the presence of the streptococcus of chronic bovine mastitis in a larger number of instances than either direct microscopic examination of films made at once from whole milk or centrifuge deposit (both of which gave very poor results), blood agar plates inoculated with a 4 mm. loopful of whole milk or centrifuge deposit, or blood agar sown with 1 c.c. of a 1 : 10 dilution of whole milk. The finding of streptococci in incubated samples should

not, however, be taken as conclusive evidence of chronic streptococcus mastitis, unless other laboratory evidence is present, as other streptococci may be present in milk and false positive reactions (13·5 per cent. in the authors' series) are therefore encountered. In such cases the significance of the streptococci present can only be determined by their isolation and identification.—A. W. STABLEFORTH.

DAVIS, D. J. (1935). **The Dissemination of Human Pathogenic Streptococci through the Cow's Udder.**—*J. Bact.* **29.** 42-43.

It is assumed that streptococci from human sources gain access to the udder *via* the teat canal. In affected cows the epithelial surface of the lactiferous duct was shown to be rough and milk could be retained in the crevices. During the milking of 13 cows, the teat was placed in carbol fuchsin and the pressure on the teat was released. In no case did the dye ascend beyond half way up to the cistern, even in a leaking teat.

In a case of mastitis produced by introducing haemolytic streptococci *via* the teat canal, no pathological changes were demonstrated in the teat to indicate involvement of the lymphatics or subepithelial tissue.—A. BROWNLEE.

GANA, I. (1935). Studio sperimentale sull'impiego del siero antistreptococcico polivalente del Laboratorio Batteriologico Militare. [**Use of Polyvalent Strangles Antiserum**].—*Clin. vet., Milano.* **58.** 745-757. 2 tables.

The hyperimmune serum used in this work was produced by inoculating horses with strains of streptococci, the virulence of which had been increased by passage through small animals, together with strains of streptococci taken directly from natural cases of strangles. The injections were given over a period of six months until the animals could withstand an intravenous injection of 500 c.c. of a virulent culture. Such serum with 0·5 per cent. of phenol added retained its specific properties for several months.

Using 90 c.c. as the first dose followed by doses of 60 c.c. on several subsequent days, the author claimed that good results were obtained, as the reduction in the mortality rate among the horses suffering from strangles under his care fell from 8·6 to 0·6 per cent. after the introduction of the serum.—J. A. NICHOLSON.

OKISCHEFF, T. R. (1935). Ueber die Aufenthaltsdauer des Bac. anthracis im Organismus der mit Antianthrax-Serum behandelten Kaninchen. [**The Survival Time of Anthrax Bacilli in the Bodies of Rabbits Treated with Anthrax Antiserum**].—*Dtsch. tierärztl. Wschr.* **43.** 693-694. 1 table.

Rabbits were treated with varying doses of anti-anthrax serum. Thirty days later each was injected with a standard dose of anthrax spores ; subsequently these animals were autopsied after varying intervals. *B. anthracis* was isolated as long as 46 days after infection. This period is considered to serve as a guide to the duration of quarantine which should follow anthrax vaccination.—E. J. P.

TOMCSIK, J., & BODON, G. (1935). Ueber das Vorkommen der Milzbrandbazillen-Kapselsubstanz im Blute von infizierten Tieren und ihre Bedeutung für den Infektionsverlauf. [**The Appearance and Significance of the Specific Capsular Material in the Blood of Animals Infected with Anthrax**].—*Z. ImmunForsch.* **84.** 308-320. 4 tables. [4 refs.]

Normal and immunized rabbits were infected with *Bacillus anthracis*. Samples of blood were taken at intervals and examined for the presence of *B. anthracis* and for precipitating and complement-fixing antibodies for the specific polysaccharide of the bacterial bodies and the specific capsular protein respectively. In most of

37 animals which died from anthrax, capsular substance was recognized one day before death, whilst in a few cases it was detected two days before death. The capsular substance was always recognizable in organ extracts. On the other hand, capsular substance was recognized in only two out of 25 partially immunized animals which recovered. The recognition of capsular substance and the presence of bacteriaemia ran parallel. The capsular substance found in the serum is not believed to originate from the disintegration of bacilli which have died in the blood stream because the specific polysaccharide of the bacterial bodies was never recognized. It is believed to get access to the blood simultaneously with the bacteria, or to be a product of living and multiplying bacteria in the blood stream.—A. W. S.

PETRESCO, J., & GAIGINSKI, A. (1935). Caractères de deux bacilles acido-résistants isolés des organes de cobaye. [**Characters of Two Acid-Fast Bacilli Isolated from the Guinea Pig**].—*C. R. Soc. Biol. Paris.* **119.** 1282-1283.

The authors describe an acid-fast bacillus isolated from a guinea pig that had been inoculated with milk from a human patient affected with pulmonary tuberculosis. The organism had the general characters of an avian tubercle bacillus. They believe the guinea pig to have been infected with this organism before it was inoculated with the milk.

In another instance a paratubercle bacillus was isolated by culture from the mammary gland of a guinea pig that had been inoculated 12 days previously with a bovine strain of tubercle bacillus.—T. M. DOYLE.

PRÖSCHOLDT, O. (1935). Tilgung der Rindertuberkulose. [**Eradication of Bovine Tuberculosis**].—*Dtsch. tierärztl. Wschr.* **43.** 593-603. [7 refs.]

Pröscholdt's ten years' experience in the campaign to eradicate tuberculosis in Pomerania led him to divide herds into three classes :– (1) tuberculosis-free herds ; (2) slightly infected herds, and (3) badly infected herds.

In the treatment of herds considered to be tuberculosis-free he recommends an initial clinical and, in suspected cases, a bacteriological examination and the examination of all mixed milk for tubercle bacilli. The tuberculin test is recommended for subsequent half-yearly tests on such herds, which should be self-supporting as regards young stock for replacements, or such animals should be obtained from herds free from the disease. The calves should be fed with milk from their own herds and, if mixed milk is used, it must be properly pasteurized.

If a slightly higher charge were made for tuberculosis-free milk, Pröscholdt believes that such a measure would advance the cause of eradication schemes.

For slightly infected herds the author advocates the slaughter and removal of reactors and clinical suspects and thorough disinfection of the premises to be occupied by the non-reactors, feeding the calves on tuberculosis-free or pasteurized milk, and segregation of the non-reactors until the herd is proved to be entirely free from infection.

In badly infected herds, the Ostertag method might be used with advantage. All animals with open tuberculosis should be slaughtered, and mixed milk should be examined at least quarterly to ascertain the source of infection. Animals regarded as tuberculosis-free should be housed separately. Newly-born calves should be fed on pasteurized milk and removed from all possible infection. In this way the foundations of a tuberculosis-free herd might be laid.—M. BURKE.

—. (1935). Abatage et destruction des animaux de l'espèce bovine en mauvais état général et présumés tuberculeux. Décret du 8 août 1935. [**France ;**

Decree on Slaughter of Cattle Suspected of Tuberculosis].—*Rec. Méd. vét.* **111.** 629-630.

As a means of reducing the number of animals suspected of tuberculosis, the French Ministry of Agriculture has been allocated funds to purchase in the open market all debilitated animals for the purpose of destruction. Veterinary commissioners will make the purchases and farmers are encouraged to send all undesirable cattle to the market for the purpose. The maximum price is fixed at Fr.1 per kg. live weight. After slaughter the carcasses will be " rendered down " for by-products or destroyed at the discretion of the veterinary inspector.—F. B.

KANAUKA, K. (1934). Galviju ir kiauliu tuberkuliozas Lietuvoje 1933 metais. [**Tuberculosis of Cattle and Pigs in Lithuania in 1933**].—*Vet. ir Zootech., Kovno.* **11.** 111-117. 5 tables. [2 refs.] [Abst. from German summary].

In Lithuania there is a voluntary tuberculosis eradication scheme organized by the State. The participating herds must be tested with tuberculin and clinically examined at least once a year. Bacteriological diagnosis is performed by the State Veterinary Bacteriological Institute at Kaunas.

In 1933, 225 herds with 7,046 cattle were examined ; 132 of these were affected with open tuberculosis and 1,240 (17·6 per cent.) gave positive reactions to tuberculin. The infection figure for the whole of the country is believed to be much lower as, according to the abattoir returns, only 2·1 per cent. of all adult cattle and 2·3 per cent. of the pigs slaughtered were tuberculous.—J. E.

PALLASKE, G. (1935). Zur Kenntnis der produktiven tuberkulösen Gewebsreaktion des Rindes und ihrer Beziehung zum Tuberkelbakterien-Typus. [**Tissue Reaction in Cattle to Different Types of** *Mycobact. tuberculosis*].—*Dtsch. tierärztl. Wschr.* **43.** 609-613. 2 figs., 1 table. [14 refs.]

Studies on tuberculosis have shown that the ways in which the lesions develop vary considerably and depend upon the type of stimulus which causes the inflammatory reaction and upon the peculiarities of the tissue affected. Thus, the reaction may show every variation between an exudative and a productive inflammation. In pigs, avian tubercle bacilli cause a pronounced productive tissue reaction whereas bovine bacilli do not, and a macroscopic examination of the lesion is sufficient to determine which type of bacillus is present. Similar productive lesions are also seen in cattle and, as avian bacilli are known to attack these animals, the author made a careful study of a series of cases showing this type of lesion. Productive lesions are most commonly found on the pericardium, pleura and serous membranes and in the lungs. They are seen as diffuse, greyish-white deposits which do not show circumscribed nodules, caseation or calcification. On histological examination, the lesion is seen to be composed of epithelioid and wandering cells, fibroblasts, lymphocytes and capillaries.

From 16 cases examined, avian bacilli alone were isolated twice, avian and bovine bacilli twice and from the remainder only the bovine type. In cattle, therefore, the type of bacilli present cannot as yet be determined by macroscopic examination of the lesion.—J. A. NICHOLSON.

FELDMAN, W. H., & SCHLOTTHAUER, C. F. (1935). **The Isolation of the Organism of Avian Tuberculosis from Cattle.**—*J. Amer. vet. med. Ass.* **86.** 635-643. 2 tables. [19 refs.]

In a self-contained herd of cattle that had been subjected to tuberculin tests at regular intervals during a period of 11 years, 21 animals reacted to the test. A flock of fowls in which tuberculosis was known to exist was in direct contact with

the cattle. In a considerable number of the reacting animals no tuberculous lesions were found at autopsy and in the remainder small isolated lesions were present in the skin or in the mesenteric lymph glands. Material from 11 animals was inoculated into rabbits, guinea pigs and fowls and avian tubercle bacilli were isolated from three of the specimens. The organisms were isolated from a lesion in the subcutis and from a mesenteric lymph gland in one animal, from a mesenteric lymph gland in the second and from an abscess in the subcutaneous tissue in the third.—T. M. Doyle.

van Deinse, F., & Domanski, M. A. (1935). Recherches sur la septicémie tuberculeuse chez le lapin, dite du type Yersin. [**The Yersin Type of Tuberculosis in the Rabbit**].—*C. R. Soc. Biol. Paris.* **119.** 1297-1299. [1 ref.]

The authors record that the intravenous inoculation (1 mg.) of rabbits with virulent bovine strains or with S types of avian strains of tubercle bacilli induces a septicaemia and death in about three weeks.

They believe it to be possible to differentiate between the two types of bacilli from the fact that bovine strains give rise to macroscopic granulations in the rabbits' lungs whereas this does not occur with avian strains.—T. M. Doyle.

Lagrange, E., & Lagrange, M. T. (1935). La transmission prénatale de la tuberculose existe-t-elle chez le cobaye? [**Does Prenatal Transmission of Tuberculosis occur in Guinea Pigs?**]—*C. R. Soc. Biol. Paris.* **119.** 1268-1270. [1 ref.]

The authors artificially infected 15 pregnant guinea pigs with tuberculosis to determine whether the infection passed from the dam to the young. In most instances the young were aborted dead as the result of the infection. None showed macroscopic lesions of tuberculosis. On one occasion the inoculation of a suspension of foetal liver gave rise to tuberculous lesions in a healthy guinea pig. The results obtained appear to be opposed to the view that prenatal infection with tuberculosis occurs in the guinea pig; as a general rule the acid-fast bacilli in the internal organs of the foetus cause death before birth.—T. M. Doyle.

Laporte, R. (1935). Dissociation du bacille tuberculeux de type bovin. [**Dissociation of the Bovine Type of Tubercle Bacillus**].—*C. R. Soc. Biol. Paris.* **120.** 399-401. [1 ref.]

Repeated subcultivation of the S dysgonic type of the bovine tubercle bacillus on glycerin potato may change it into an R eugonic type. Prolonged cultivation on this medium has the same effect but, when then sub-cultivated on egg medium, recently formed R types give rise to an unusual type which is smooth but difficult to emulsify. Some of the colonies, however, remain small and less pigmented and these, when put back on to potato medium, revert to the R type. Some strains can be easily changed from the S type to the R type, while others retain their dysgonic characteristics for long periods.—C. V. Watkins.

Piasecka-Zeyland, E., & Zeyland, J. (1935). **Experiments on the Filterability of Tuberculo-Virus.**—*Amer. Rev. Tuberc.* **31.** 346-349. [16 refs.] [Copied *verbatim* from *Bull. Hyg., Lond.* **10.** 672-673. Signed S. Roodhouse Gloyne].

The authors summarize the various methods which have been employed for the detection of the filterable virus of *Myco. tuberculosis*. They are as follows: (1) The original method of filtration of tuberculous material or cultures of tubercle

bacilli through Chamberland candles and the injection of filtrate into animals, with recovery of acid-fast bacilli. (2) The method of VAN DEINSE consisting in the rapid detection of acid-fast bacilli by the intraperitoneal injection of calcium phosphate into animals before the injection of the tuberculous filtrate. Calcium phosphate causes abscesses in the omentum in which the discovery of acid-fast bacilli is said to be easier. (3) The method of NÈGRE by the use of tissue depressants. These tissue depressants are acetone extracts of tubercle bacilli and when injected into guineapigs previously inoculated with filterable virus are said to favour the development of lesions. (4) The method of SANARELLI which consists in the substitution of collodion filters for inaccurate porcelain filters. (5) The method of PANEK. This consists in the transformation *in vivo* in tuberculous guineapigs under the influence of tuberculotensin (substance prepared by Panek) injections of visible forms of tuberculous virus into invisible elements ; the presence of these invisible elements is proved by the inoculation of organ filtrates of such treated guineapigs into new guineapigs, which succumb after successive passages to typical tuberculosis.

Experiments made by the authors by all five methods, using 209 guineapigs and 77 cultures were negative. They note the significant fact that positive results obtained by the workers of one school cannot be repeated by those of another.

NÈGRE, L., & BRETEY, J. (1935). Mise en évidence du virus tuberculeux dans le sang par la méthode des injections d'extrait acétonique de bacilles de Koch. Caractères des souches de bacilles tuberculeux ainsi isolés. [**The Demonstration of Tuberculous Bacillaemia by the Injection of Acetone Extracts of Tubercle Bacilli**].—*Ann. Inst. Pasteur.* **55.** 273-283. [8 refs.]

Most authors have found that tuberculous bacillaemia is intermittent. It has already been shown that the inoculation of acetone extract of tubercle bacilli into guinea pigs, previously injected with material suspected of being tuberculous, led to the isolation of acid-fast bacteria from the blood stream when other methods of diagnosis had failed. The authors tested this sensitive method on the blood of tuberculous guinea pigs to find out if tuberculous bacillaemia could be detected more often. The blood samples were taken at various intervals and inoculated into treated and untreated guinea pigs. Out of 45 animals used, those receiving repeated subcutaneous injections of acetone extract of tubercle bacilli gave five positive reactions while the controls only reacted twice.

The bacilli used for the experiment were of the human type and those isolated from the treated group of guinea pigs had the following characters :– rough colonies, pathogenic for guinea pigs and rabbits but not for the fowl; after several sub-cultivations one of the strains lost its virulence for the rabbit.

This treatment of test guinea pigs by acetone extract of tubercle bacilli brings to light the presence of a tuberculous virus which has not the virulence of Koch's tubercle bacillus and which, therefore, cannot be isolated by ordinary guinea pig inoculation.—C. V. WATKINS.

LOURS, F. (1935). Prémunition de la tuberculose bovine par la vaccination BCG. Son mode d'application pratique. [**BCG Vaccination of Calves in France**]. —*Rec. Méd. vét.* **111.** 583-584.

An account is given of the author's practical experiences with BCG vaccine over a period of four years, during which time 670 cattle were vaccinated. The procedure adopted was to isolate the calves immediately after birth and feed them on boiled milk with a daily supplement of 20 drops of ergosterol. The calves were vaccinated when five to six days old and isolated for a further 30 days before they were exposed to infection. Only one vaccinated animal, a two-year-old heifer,

developed clinical tuberculosis and *post-mortem* examinations carried out on 37 of the vaccinated animals, which were slaughtered for other reasons, revealed no evidence of the disease.—F. BLAKEMORE.

—. (1934). Riassunto dei risultati degli esperimenti di raffronto vaccinale eseguiti negli anni 1932-1933. **[Summary of Results of Experiments in Vaccination Carried Out in the Years 1932 to 1933]**.—*Notiz. Ist. antituberc. Milano.* **12.** 22-41. 9 tables.

These are summaries of six series of experiments on young calves for the purpose of comparing the results of intravenous and subcutaneous injections of massive doses of killed and living tubercle bacilli of the human and bovine types, and also of living and dead BCG vaccine ; also to test the potency of certain stocks of virulent bovine tubercle bacilli, and the tolerance of new-born calves to such injections. The results are too varied to summarize shortly.—F. BULLOCK.

I. CLAWSON, B. J. (1935). **The Relation of Antibody Content to Allergy and Resistance in Animals Vaccinated with BCG.**—*J. Bact.* **29.** 32.

II. CLAWSON, B. J. (1935). **The Relation of Allergy, Resistance and Antibodies in Animals Vaccinated with the Calmette-Guérin Bacillus (B.C.G.).**—*Amer. J. Path.* **11.** 849-851.

I. Rabbits were injected at weekly intervals, some subcutaneously and some intravenously, with 1 to 2 mg. of BCG, either living or heat-killed. The degree of allergy was determined by the Mantoux test and the concentration of antibodies in the blood estimated by the complement-fixation, agglutination and opsonic index tests. The degree of immunity was estimated by comparing the resistance to a test dose of virulent bovine culture in the test animals and in non-vaccinated controls.

Rabbits and guinea pigs vaccinated with BCG acquired definite resistance against virulent *Mycobact. tuberculosis.*

The antibody content showed a direct relationship to the degree of resistance, but did not necessarily show any relationship to the presence of allergy.

II. A somewhat fuller account of I, with the discussion added.—A. B.

CHAUSSINAND, R. (1935). A propos des différents modes de vaccination par le BCG. Avantages de la méthode des deux injections souscutanées simultanées, variations de la virulence du BCG dans la prémunition de l'espèce humaine. **[The Advantages of the Simultaneous Double Subcutaneous Method in Vaccination with BCG. Variation in the Virulence of BCG]**.—*Ann. Inst. Pasteur.* **55.** 451-473. 3 tables. [17 refs.]

The oral method of BCG premunition is simple and efficacious, but it has the disadvantage that the allergic sensitivity of vaccinated individuals is both irregular and slow in its development. Three months after such vaccination 70 per cent. at the most are allergic. As it is essential that the vaccinated persons should be isolated from infection until protection is established, this is a disadvantage. Other methods have been tried. The intradermal method is not so easy nor has it any advantage over the subcutaneous method. The intramuscular method, employing two simultaneous injections, produces an allergic state sooner than the subcutaneous method, but is often followed by post-vaccination cold abscesses. The administration of two injections at two sites at the same time by the subcutaneous method is, in the experience of the author, the best method. Over 90 per cent. react to tuberculin within seven weeks.

It is impossible to recommend a dose for world-wide use. So much depends

upon the time which elapses, and the temperature at which the vaccine is kept between its preparation and use. The vitality and virulence of BCG undergoes a progressive attenuation, the most important factor concerned being temperature.
—GWILYM O. DAVIES.

SADETTIN, M. (1935). Fixité des propriétés antigènes et allergisantes du vaccin BCG. [**The Stability of the Antigenic and Allergic Properties of BCG**].—*C. R. Soc. Biol. Paris.* **119.** 958-961. [3 refs.]

BOQUET and NÈGRE reported in 1929 on the antigenic properties *in vitro* and *in vivo* of BCG. Sadettin has now repeated their work, using the same strain, to ascertain if any changes have occurred in the interval. The strain had been sub-cultured 504 times on bile potato.

He concludes from his tests that during the period of 1928 to 1935 this strain of BCG had not undergone any changes in either its antigenic or allergic characters.
—T. M. DOYLE.

GERLACH, F., BROSCH, J., & KAPLAN, M. (1935). Weitere Versuche einer künstlichen Virulenzsteigerung des BCG. [**Attempts to Increase the Virulence of BCG**].—*Z. Tuberk.* **72.** 21-27. [Copied *verbatim* from *Bull. Hyg., Lond.* **10.** 674. Signed S. ROODHOUSE GLOYNE].

This paper deals with experiments designed by the authors to raise the virulence of BCG. They cultivated the BCG strain on haematin iron medium containing 3 to 5 per cent. of haematin, the medium having various *p*H values, *i.e.*, 7·1, 6·8 and 6·6. No alteration in virulence was obtained by these means.

A very slight increase of virulence was obtained by inoculating animals intraperitoneally with BCG and emulsions of aleuronate.

BCG cultures were next exposed to the influence of 5 per cent. sulphuric acid for varying times up to 20 minutes, and then inoculated into animals, but no change in virulence was noted. A comparison of deep cultures of BCG in Besredka's broth before and after sulphuric acid treatment showed no definite change. Finally, the addition of 10 to 25 per cent. of ox or guineapig haematin to Besredka's broth caused no effect on the virulence.

SAENZ, A. (1935). État d'allergie intense, rapide et durable, conféré au cobaye par ingestion de bacilles tuberculeux morts enrobés dans l'huile de vaseline ; son mécanisme. [**The Mode of Action of Dead** *Mycobact. tuberculosis* **Incorporated in Vaseline in Producing Allergy in the Guinea Pig by the Oral Route**].—*C. R. Soc. Biol. Paris.* **120.** 870-873. 2 figs. [3 refs.]

When guinea pigs are fed with an emulsion of killed tubercle bacilli in vaseline, they rapidly become allergic and may continue to react for at least six months. *Post-mortem* examinations of animals treated in this manner have shown that the organisms reach the lungs where they induce the formation of caseo-necrotic lesions.—R. E. GLOVER.

NAI, D. (1934). Sul potere immunizzante dei bacilli tubercolari uccisi. [**Immunizing Value of Dead Tubercle Bacilli**].—*Notiz. Ist. antituberc. Milano.* **12.** 68-83. [6 refs.]

The author refers to the earlier work indicating that heat-killed tubercle bacilli do not immunize against tuberculosis and then discusses the investigations by DREYER and other workers to establish the value of killed defatted tubercle bacilli as a vaccine [see this *Bull.* **5.** 109]. He concludes that the latter work has given encouraging results but that the method is at present only in the experimental stage.—J. A. NICHOLSON.

Boissevain, C. H. (1935). **A Comparison of the Antigenic Properties of Defatted Tubercle Bacilli and their Derived Proteins.**—*Amer. Rev. Tuberc.* **31.** 547-552. 1 table. [3 refs.]

Hypersensitiveness caused by the injection of defatted tubercle bacilli approaches that caused by tuberculosis. The author considers that it is the compound of protein and polysaccharide which carries all the typical properties of the tubercle bacilli and that, when the union is broken, most of the antigenic activity is lost. He considers that the importance of the soluble protein, that is, of " O.T.", among the products of the tubercle bacillus has been much overrated and that, if it plays any part in the production of allergy it is less than one-millionth part of that of the polysaccharide complex.—G. Dods Munro.

I. Macheboeuf, M. A., & Bonnefoi, A. (1935). Etudes sur les antigènes fixateurs du bacille tuberculeux. (Deuxième mémoire). Essais de purification et de fractionnement des fractions lipoïdiques actives comme haptènes, extraites de bacilles tués par la chaleur. [**The Antigens of** *Mycobact. tuberculosis.* **II. The Purification and Fractionation of the Active Lipoid Fractions of Heat-Killed Tubercle Bacilli**].—*Ann. Inst. Pasteur.* **55.** 433-440. [3 refs.] [For abst. of previous article of this series, see this *Bull.* **5.** 509].

II. Macheboeuf, M. A., Lévy, Georgette, & Faure, Marguérite. (1935). Recherches sur les antigènes fixateurs du bacille tuberculeux. (Troisième mémoire). Purification de l'haptène lipoïdique de bacilles tués par la chaleur, séparation d'avec les phosphatides, élimination des impuretés azotées. Etude de quelques-uns des caractères physico-chimiques de la fraction active. [**Complement-Fixing Antigens of** *M. tuberculosis.* **III. Purification of the Lipoid Hapten of Heat-Killed Tubercle Bacilli, and Physico-Chemical Character of the Active Fraction**].—*Ibid.* 547-572. 6 tables. [4 refs.]

I. In previous publications the authors have described a method of extraction and fractionation of the lipoids of heated tubercle bacilli. They have also described the finding of an impure fraction which had the property of fixing complement in the sera of tuberculous animals.

Pursuing their investigations of this substance which behaves as a hapten, the authors say that they have not as yet succeeded in isolating it in a pure form but have made progress in that direction. The hapten property seems to be associated with substances only sparingly soluble in acetone. Acetone precipitation, however, does not afford a means of purification as other inactive substances are precipitated. The fraction isolated by acetone consists of a mixture of lipoids whose hapten activity and nitrogen content are variable. Repeated precipitation of chloroform solutions with methyl alcohol also fails to yield the substance in a pure state, as the difference in the solubility of the active and inactive substances in chloroform-methyl alcohol mixtures is too small. The most active fraction obtained, although it cannot yet be regarded as chemically pure, is from 12 to 15 times as active as equal weights of the substances contained in the " methylic antigen " of Boquet and Nègre.

II. Further work on the isolation and fractionation of the active lipoid substances contained in tubercle bacilli has revealed the following results. The active lipoids are not phospho-amino-lipoids, as they do not contain nitrogen and, furthermore, phospho-amino-lipoids themselves are inactive as haptens. The active substance is very rich in phosphorus and does not contain polysaccharides,

as no sugar is formed during hydrolysis. It is a hapten in its strictest sense, as it is not antigenic unless combined with a heterogenous protein. This hapten activity is not a property of a varied group of lipoid substances but is probably limited to a single substance.—GWILYM O. DAVIES.

WAHBY, A. M. (1934). **The Hygienic Interrelationship of Human and Animal Tuberculosis.**—*Bull. Minist. Agric. Egypt.* No. 143. pp. 25. 2 tables. [Numerous refs.]

The article begins with quotation of estimates of the extent of the ravages of human tuberculosis, and seeks to establish how far animal tuberculosis is responsible for spreading the scourge among mankind. Statistical evidence and estimates of the proportion of human cases due to bovine tuberculosis occupy several pages, and the author passes to a consideration of methods of prevention of infection from milk. Attempts at eradication in various countries are outlined and it is pointed out that, in spite of these, bovine tuberculosis has apparently increased in some countries. At the same time, the incidence of human tuberculosis of bovine origin has decreased, probably owing to pasteurization of milk.

The question of avian tuberculosis as a danger to man and other mammals is also discussed. The conclusion is reached that it is not possible to eradicate tuberculosis completely from one species without also eradicating it from the others.—E. BROWN.

MIKSCHOVSKY, F. (1935). Rotlaufendokarditis und -septikämie beim Hund. [*Erysipelothrix rhusiopathiae* **as the Cause of Endocarditis and Septicaemia in the Dog**].—*Z. InfektKr. Haustiere.* **48.** 151-154. [3 refs.]

A typical case of verrucose endocarditis, affecting the heart valves of a dog, is described. An organism was isolated from the lesions and also from other parts of the body which proved, by cultural, pathogenicity and protection tests, to be *E. rhusiopathiae* (swine erysipelas bacillus).—E. J. PULLINGER.

HELM, R. (1935). Versuche zur Virulenzsteigerung der Rotlaufbakterien vermittelst der Kapillarsteigmethode. [**The Correlation between Virulence and Capillary Attraction of** *Erysipelothrix rhusiopathiae*].—*Z. InfektKr. Haustiere.* **48.** 138-148. 3 tables. [4 refs.]

The influence of capillary attraction on cultures of *E. rhusiopathiae* was studied. It was not possible to correlate capillary attraction and virulence.—E. J. PULLINGER.

KONDO, S., & SUGIMURA, K. (1935). **Experimental Studies regarding Living Swine Erysipelas Vaccine. II. The Pathogenicity and Immunizing Property for Swine of Avirulent Swine Erysipelas Bacilli obtained by treating with Trypaflavin.**—*J. Jap. Soc. vet. Sci.* **14.** 322-339. 16 tables. [20 refs.] [In Japanese : abst. from English summary].

Strains of *Erysipelothrix rhusiopathiae* (swine erysipelas bacillus), rendered avirulent by repeated sub-cultivation on agar containing " trypaflavine " and " rivanol ", are of high immunizing value for pigs. Vaccine prepared from a 48-hour broth culture of such an avirulent strain, if preserved by the addition of 0·001 per cent. of " trypaflavine ", will retain its protective value for two months or more. The practical value of the vaccine is proved by the fact that, of 46,000 pigs treated, only two died from natural infection during the 12 months succeeding vaccination. In the same districts, over 300 deaths occurred in untreated stock during that period.—J. W. EMSLIE.

Beller, K., & Züdhi, M. (1935). Allergiestudien bei Malleus. [**Allergic Reactions in Glanders**].—*Z. InfektKr. Haustiere.* **48.** 117-137. 1 fig., 5 tables, 6 charts. [19 refs.]

Horses suffering from glanders gave allergic reactions not only to intradermal injections of mallein but also to injections of other bacterial extracts such as tuberculin and abortin, and it is considered that only when skin measurements increase fourfold or more should tests be considered positive. The above phenomenon is explained as follows. An allergic response is thought to consist of two phases – a rapid oedema and inflammation of vascular origin occurring within a few hours of intradermal injection, and a much more delayed mesenchymal reaction which may not appear for upwards of 90 hours. The vascular reaction is a non-specific reaction against the introduction of foreign protein ; the mesenchymal reaction is a specific reaction to the injection of mallein. The ophthalmic mallein reaction is purely vascular. This hypothesis is supported by experimental data. In practice a mallein test can only be interpreted accurately if skin measurements are recorded every few hours from the time of injection for as long as four days. In this way both the vascular and mesenchymal reactions can be identified. Reliance should be placed upon the latter in making a diagnosis.—E. J. Pullinger.

Beller, K. (1935). Neue Wege der Malleus-Bekämpfung in der Türkei. [**Control of Glanders in Turkey**].—*Berl. tierärztl. Wschr.* **51.** 625-627. 1 fig. [6 refs.]

An active campaign is in progress in Turkey to eradicate glanders. Definite clinical cases are slaughtered forthwith. Horses which are apparently healthy are subjected to the intradermal mallein test and reactors are slaughtered.—E. J. P.

I. Graham, R. (1935). **A Pasteurella-Like Microorganism in the Brains of Horses suffering from So-Called Cornstalk Disease.**—*Science.* **81.** 153-154.

II. Graham, R. (1935). **Direct Isolation of Pasteurella-Like Microorganisms from Brains of Horses suffering from So-Called Cornstalk Disease.**—*Ibid.* 387-388. [1 ref.]

I. This paper is a preliminary report recording the finding of an organism of the pasteurella group in the brains of seven horses from different farms affected with so-called "cornstalk disease" (cerebrospinal meningitis or "forage poisoning").

II. This paper records the isolation of a pasteurella organism from guinea pigs, pigeons and rabbits inoculated subcutaneously with suspensions of the brain from natural cases of "cornstalk disease". Cultures, from the brains of horses which had died of this disease or were destroyed when affected, made direct into broth and then sub-cultured on to ordinary media, became overgrown with a mixture of organisms, but, by sowing these broth cultures on to gentian violet agar, the pasteurella organisms could be isolated [see also this *Bull.* **6.** 161]. —A. Brownlee.

Beck, H. G., & Merkel, W. C. (1935). **Tularemia : Fatal Case of the Typhoid Form Caused by Ingestion of Rabbit : Autopsy Report.**—*Sth med. J.* **28.** 422-428. 5 figs. [16 refs.] [Copied *verbatim* from *Bull. Hyg., Lond.* **10.** 580. Signed W. G. Savage].

In the United States in 1932 there were reported 3,653 cases of tularaemia with 179 deaths, a mortality of 4·9 per cent. A good summary is given of the various modes of infection. The case reported in great detail refers to a white man, aged 61, the method of infection being eating imperfectly cooked wild rabbit. The symptoms developed within 24 hours and were mainly weakness, headache,

fever, general muscular pains and vomiting. Later he became profoundly toxic with a temperature ranging from 102° to 105°F. with death on the 12th day of the disease. *Post-mortem* points of interest were considerable ulceration of the gastro-intestinal mucosa, multiple areas of focal necrosis of the liver, spleen and regional lymph nodes, while the lungs showed only congestion, oedema, and infarction. Agglutination tests for tularaemia were negative but guinea pig inoculation with blood and tissue obtained at autopsy proved positive.

SILBERSTEIN, W. (1935). **The Practical Importance of Modern Serological Methods for Differentiating the *Salmonella* Group.**—*J. Path. Bact.* **41.** 199-203. 2 tables. [10 refs.]

The author advocates slide agglutination as a prompt and reliable method of determining the serological type of salmonella. It is of importance to deal with sera which have been well tested and are found to be reliable. Different sera are used for determination of the " H " and " O " antigens.

In difficult cases, when it is desirable to procure the specific phase from a non-specific-phase culture of a diphasic organism, recourse to growth in broth containing 1 per cent. of a non-specific serum proved successful.

The Breslau type of salmonella (*S. typhi-murium*) has been isolated from laboratory animals in Palestine for the first time and typed by the methods described.—R. LOVELL.

SCHÖNBERG, F. (1935). Zur Beurteilung des Bact. suipestifer bei der amtlichen bakteriologischen Fleischuntersuchung. [**Significance of *Salmonella suipestifer* in Bacteriological Meat Inspection**].—*Dtsch. tierärztl. Wschr.* **43.** 589-590. [24 refs.]

The author draws attention to the fact that *S. suipestifer* falls into the group of members of the *Salmonella* genus pathogenic for the human being and responsible for a type of food poisoning.—E. J. PULLINGER.

ITABASHI, K. (1935). **On a Pure Antiflagellar Serum Prepared by the Injection with a Culture Filtrate of *Salmonella cholerae-suis*.**—*J. Jap. Soc. vet. Sci.* **14.** 314-321. 2 tables. [13 refs.] [In Japanese: abst. from English summary].

An 18-hour broth culture of motile swine fever bacilli was filtered through a Berkefeld V candle and the filtrate inoculated intravenously into rabbits, three doses of 2 c.c. being given at intervals of five days. The serum so obtained readily agglutinated the homologous organisms into soft, loose clumps in very high dilution, but did not interact with non-motile strains or with heated bacilli. Neither flocculation nor precipitation occurred between antiflagellar serum and culture filtrate, whilst the latter was incapable of absorbing floccular agglutinins from the antiflagellar serum.—J. W. EMSLIE.

HIRATO, K., MIURA, S., OYA, T., & KASAI, K. (1935). **Experimental Studies on Infectious Abortion in Mares. I. Bacteriological Observations. II. Haematological Observations.**—*J. Jap. Soc. vet. Sci.* **14.** 273-294 and 295-313. 31 tables, 10 graphs. [Numerous refs.] [In Japanese: abst. from English summary].

I. Fourteen pregnant mares were inoculated intravenously with *Salmonella abortus-equi*, eight being given 1 to 2 mg. of a strain of low virulence and six receiving 1 mg. of a highly virulent strain. Observations also included one naturally aborting mare.

In 13 of the mares *S. abortus-equi* was recovered from the blood 24 to 48 hours

after inoculation, but in the remaining case the blood was sterile five minutes after inoculation.

At the time of abortion blood culture was rarely positive. In some cases the organism was recovered from the urine, but never before abortion. Recovery from milk was successful for a period of from one to 12 days after abortion. The organism could never be cultivated from the faeces. In the vagina the organism was found in greatest numbers for four to seven days after abortion. Bacilli of low virulence were not recovered from the vagina later than six to ten days after abortion but organisms of higher virulence survived for ten to 22 days. In the naturally aborting case *S. abortus-equi* was not detectable after 13 days.

The organs and blood of all aborted foetuses yielded pure cultures of *S. abortus-equi* excepting one case in which infection was complicated by a β-haemolytic streptococcus. As a rule the stomach and small intestine were heavily infected but not so the lower parts of the alimentary tract.

After abortion the vaginal flora comprised *S. abortus-equi* and various cocci.

II. Artificial infection induced oligocythaemia which was most pronounced in two to six days. It recurred in a greater degree prior to abortion and was accompanied by slight poikilocytosis and anisocytosis, the appearance of Howell-Jolly bodies and alterations in viscosity and in haemoglobin.

Mild leucocytosis also occurred after inoculation and was succeeded by leucopenia, which was maximal in four to six days, after which leucocytosis again supervened, to reach its maximum four days before abortion. Abortion led to leucopenia which persisted for two to three weeks. The leucocytosis was both relative and absolute whilst maximal leucopenia was accompanied by the appearance of myelocytes and metamyelocytes, some vacuolation of large mononuclears and slight neutrophilic basophilia.

There was slight increase of the total serum protein which was due mainly to increase of serum globulin that supervened just after inoculation and persisted until after abortion.

The prenatal leucocytosis and postparturient oligocythaemia of normal births are never so severe as in cases of infectious abortion.—J. W. Emslie.

I. Krage, P. (1935). Gehäuftes Auftreten des infektiösen Stutenabortus in Ostpreussen und seine Bekämpfung. [**The Control of Infectious Equine Abortion in East Prussia**].—*Dtsch. tierärztl. Wschr.* **43.** 660-661.

II. Eickmann, H. (1935). Stutensterilitäts-Bekämpfung in der Rheinprovinz in den letzten 3 Jahren. [**The Control of Sterility in Mares in the Rhine Province during the Last Three Years**].—*Ibid.* 661-664.

I. It is stated that paratyphoid abortion in mares had not been observed in East Prussia before 1932; since then it has spread alarmingly and many districts are badly infected. In some places 100 per cent. of pregnant mares aborted and foals infected by the same organism also died. Krage describes the hygienic measures he has taken to control the disease: these are orthodox.

II. A similar report for the Rhine Province, where horses ("Kaltblut") not of thorough-bred type are bred. In 1933 the author instituted a scheme for free veterinary examination and for treatment of mares during the winter half-year by rational therapeutic and surgical procedure administered by skilled persons. In the winter 1934 to 1935, 8,000 mares were treated and nearly 40 per cent. later produced live foals. The fertility index of the 20,000 mares in the province prior to 1933 was about 50 per cent. As a result of this campaign it is hoped that an additional 3,000 foals will be produced annually.

Statistics are given on 577 mares treated, (1) by a single uterine antiseptic

irrigation (various drugs); (2) by irrigation and " yatren-vaccine "; (3) by irrigation and " prolan ", and (4) by a combination of all three. The percentage of success as measured by pregnancies was 46, 35·6, 28·6 and 63 respectively. The significance of these figures is discussed.—J. E.

STAUB, A. (1935). Sur l'agglutination du Bacillus pullorum. [**Agglutination of *Salmonella pullorum***].—*C. R. Soc. Biol. Paris.* **120.** 341-342. [1 ref.]

In a series of agglutination tests, using standardized suspensions of *S. pullorum*, the agglutination was more marked when the pH of the mixture was between 7·5 and 8·0. Serum which had been stored for some time was more affected by the pH of the mixture than was a fresh sample.—F. BLAKEMORE.

HUTT, F. B. (1935). **On the Physiological Basis of Genetic Resistance to Salmonella pullorum in the Fowl.**—*Genet. Soc. Amer.* pp. 66-67. Suppl. to *Amer. Nat.* **69.**

The author speaks of the resistance to *S. pullorum* infection shown by White Leghorns and states that it does not appear to be associated with a genetic linkage. The body temperature of White Leghorns and Rhode Island Reds was the same at hatching, but was higher in White Leghorns by 0·8° to 0·9°F. on the sixth to ninth day. The erythrocyte and leucocyte counts were significantly higher in Rhode Island Reds. [There does not appear to be justification for the suggestion that fowls of the White Leghorn breed are resistant to *S. pullorum* infection.—Ed.]
—R. F. GORDON.

BUNYEA, H. (1935). **Direct Transmission of Pullorum Disease among Adult Fowls.**—*Poult. Sci.* **14.** 355-360. 4 tables. [13 refs.]

A group of 12 healthy birds was placed in contact with 35 reactors in a laying house for a period of seven months. The two groups were then separated, mated and used for breeding. Bacteriological examination was made of all chicks that were dead in shell or that died within 14 days of hatching and of the ovaries of all the adult birds. This examination showed that six of the 12 healthy birds had become infected.—W. J. IRONSIDE.

—. (1935). **Report of the Special Committee on Bang's Disease [Amer. Vet. Med. Ass.]**—*J. Amer. vet. med. Ass.* **87.** 472-474.

A state and federal eradication campaign exists which provides for blood testing of herds and slaughter of reactors with some compensation from federal funds. Of 3,317,760 cattle tested in 46 states, 381,607 reactors were found. The initial test revealed 14 per cent. and the first retest of infected herds 4 per cent. of reactors. Where proper advantage has been taken of the plan, many owners have been able to free their herds from infection. The stimulation of nation-wide interest should encourage the continuance of the co-operative program. Veterinarians should impress on the minds of their clients the necessity for continued vigilance, particularly until the disease can be eradicated from large areas, which would remove the risk of contact with neighbouring infected herds. Further, calfhood vaccination under field conditions should be pursued in view of the encouraging results obtained experimentally.

Both the tube and plate methods of agglutination test are considered to be satisfactory, and possibly the whole blood stained antigen plate test may also be satisfactory. Under field conditions, the plate tests are more appropriate.

The committee also considers that research into abortion from other causes should be instituted. The following recommendations are made :– (1) uniform

tests and classification of reactors ; (2) interstate co-operation ; (3) standardization of antigens, and (4) continuation of the co-operative program, with state compensation to farmers for condemned cattle.—F. H. Manley.

Cernaianu, C., & Jitarciuc, Nina. (1935). Sur l'avortement infectieux des bovidés à *Brucella bovis* Bang en Bessarabie. Premier cas de brucellose humaine dans cette province. [*Br. abortus* **Infection of Cattle in Bessarabia, with an Account of the First Case of Human Brucella Infection in this District**].—*C. R. Soc. Biol. Paris.* **120.** 350-352. [5 refs.]

An account is given of *Br. abortus* infection of cattle in Bessarabia. The authors also investigated one case of the disease in a veterinary surgeon.—F. B.

Holth, H. (1935). Die Bekämpfung des ansteckenden Verwerfens durch hygienische Massnahmen und durch Vaccination. [**The Control of Bovine Contagious Abortion by Hygienic Measures and Vaccination**].—*Arch. wiss. prakt. Tierheilk.* **69.** 117-127. 4 tables. [2 refs.]

A translation from Norwegian [see this *Bull.* **5.** 333].—J. E.

Randall, R. (1935). **Brucellosis in Panamanian Cattle.**—*Vet. Bull. U. S. Army.* **29.** 332-335. 2 tables. [1 ref.]

The author made a survey of the incidence of bovine contagious abortion in cattle in Panama by an agglutination test of the sera of 300 cattle brought from various parts of the country to Panama City for slaughter. About 5 per cent. of the samples gave positive reactions (titres of 1 : 80) and 5·2 per cent. gave doubtful reactions (titres of 1 : 40).—C. V. Watkins.

Sholl, L. B. (1935). **Some Observations on Fetal Pneumonia.**—*Cornell Vet.* **25.** 359-364. 2 tables. [1 ref.]

The author made an examination of 69 foetuses which had been aborted at from five to nine months. Forty-five of these were from cows which reacted positively to the agglutination test for *Brucella abortus* infection. A histological study of the positive group revealed that 71 per cent. of the foetuses showed some evidence of pulmonary infection, whereas abnormalities were only seen in the lungs of four of the foetuses obtained from the abortion-free cows. The author concludes from these observations that there is a much greater prevalence of foetal pneumonia in abortion due to *Br. abortus*, and that the pulmonary lesions which may be present in calves born at or near full term may develop into an extensive pneumonia, or predispose them to infection with other organisms. —F. Blakemore.

Bendinger, G. (1935). Ueber die Fleckniere bei Schafen und ihre Beziehung zur Brucellainfektion. [**Spotted Kidney in Sheep and its Connexion with Brucella Infection**].—*Arch. wiss. prakt. Tierheilk.* **69.** 290-295.

The author describes a condition which was found to be present in 16 sheep out of a total of 800, simulating that known as " spotted " kidney of the calf. The cause was believed to be due to a brucella infection, although no details of a bacteriological investigation support this view. The histological changes were those of a nodular chronic nephritis.—S. J. Edwards.

Köbe, K. (1935). Seuchenhaftes Ferkelsterben verursacht durch Brucella abortus. [**Infectious Disease in Piglets caused by** *Br. abortus*].—*Dtsch. tierärztl. Wschr.* **43.** 545-547. [16 refs.]

Br. abortus infection was suspected to be present in a piggery in which 13 sows gave birth to litters of which some were dead at birth and some died a few days later. The blood of nine sows agglutinated a suspension of a bovine strain of *Br. abortus* at a titre of 1 : 50 or over. The blood of a 15-day-old young pig was found to react at a titre of 1 : 200. The injection of stomach contents from piglets from one affected litter into guinea pigs induced the appearance of agglutinins for *Br. abortus* of the bovine and porcine strains ; in the case of piglets from another litter it was impossible to detect brucella either by guinea pig inoculation or by direct culture. The same organism was found to be present in the testicle of one boar. Although no biochemical tests were carried out, the author is of the opinion that the strain responsible was of bovine origin and probably the result of infection by drinking infected milk.—S. J. Edwards.

Feldman, W. H., & Olson, C., Jr. (1935). **The Pathogenicity of Brucella abortus for White Mice.**—*J. infect. Dis.* **57.** 212-222. 6 figs., 4 tables. [8 refs.]

Three bovine and three porcine strains of *Br. abortus* were used to inoculate 36 male mice intraperitoneally. The mice were divided into three groups and killed 30, 44 and 70 days after inoculation. *Br. abortus* was isolated from 28 of the 34 spleens examined. More positive cultures were recovered from those killed after 30 days than from the other two groups. The pathology of the condition was also studied. Macroscopic lesions were rare apart from enlargement of the spleen, which was observed in ten of the 36 examined. Microscopical lesions were found in the lung, liver, kidney, spleen, testis and epididymis, but most constantly in the liver and kidney, the principal cells involved in the reaction being hystiocytes. There were no outstanding differences in the pathogenic effects of the strains used.

The authors suggest that mice could replace guinea pigs for the isolation of *Br. abortus*.—A. W. Taylor.

Ebner. (1935). Atypische Bruzellose bei einem Pferde. [**Atypical Brucella Infection in a Horse**].—*Dtsch. tierärztl. Wschr.* **43.** 547.

A four-year-old horse, affected with chronic lameness due to a progressive arthritis involving the pastern and coffin joints was left for two years at grass. Towards the end of the period it developed a large swelling in the region of the withers. After surgical treatment, tissue from the lesion was subjected to bacteriological investigation and *Br. abortus* was isolated. Simultaneously specific agglutinins were present in the blood at a titre of 1 : 500.—S. J. Edwards.

Dopter, P. (1935). Recherche de foyers d'infection mélitococcique par séro-agglutinations dans le lait. [**Diagnosis of *Brucella melitensis* Infection by Milk Agglutination**].—*C. R. Soc. Biol. Paris.* **120.** 882-884. [2 refs.]

The author carried out agglutination tests of milk whey from cattle with a suspension of the porcine strain of *Br. abortus*, the whey being obtained by the chloroform method of Hall and Learmonth [see this *Bull.* **3.** 603]. He compared the results with those of blood agglutination tests and found a titre of 1 : 10 for whey to correspond usually to a titre of 1 : 40 for serum, when a positive reaction was obtained on a mixed sample from four quarters. Further tests showed the advisability of testing the fore-milk from each quarter, in which case one or more of the samples usually more closely approximated the titre of the serum reaction. He proposes to test the influence of gestation, period of lactation, etc., on this method of diagnosis.—C. V. Watkins.

—. (1935). Deutsches Reich. Die in der Zeit vom 1 Oktober 1933 bis 30 September 1934, bekanntgewordenen Erkrankungen bei Menschen infolge Infektion mit Brucella abortus Bang. [**Germany : Cases of** *Br. abortus* **Infection in Man between October, 1933 and September, 1934**].—*Reichsgesundheitsblatt.* **10.** 964-965. 5 tables. [3 refs.]

Between October, 1933 and September, 1934, 530 cases of *Br. abortus* infection in man were reported in Germany, 390 of these being in Prussia. When grouped according to ages, by far the highest incidence in both sexes occurred between the ages of 20 and 39 years. Only two cases were reported in children below ten years of age. Eight cases were recorded in people between 70 and 74 years of age. Approximately three times more men than women were affected. Five of the cases were laboratory infections, about two-thirds of all cases were in people in contact with infected cows or engaged in handling raw milk. Fifteen of the cases occurred in veterinary surgeons.—E. J. Pullinger.

Rosati, T. (1935). Il bradsot delle pecore in Sicilia. [**Braxy in Sheep in Sicily**]. —*Clin. vet., Milano.* **58.** 731-744 and 801-807. 1 table. [Numerous refs.]

In the two outbreaks of braxy recorded, the incidence was chiefly in one- to three-year-old well-bred sheep in good condition, death occurring in two to four days. The most pronounced symptoms were a raised temperature, dyspnoea, a blood-stained discharge from the mouth and nose, acute colic and blood-stained diarrhoea. On *post-mortem* examination, a large quantity of blood-stained pericardial and peritoneal fluid was present, the liver, spleen and kidneys were enlarged, the lungs were oedematous and the mediastinal lymph glands were enlarged and contained blood. The most striking lesion was a haemorrhagic inflammation of the abomasum and duodenum. Pure cultures of the " braxy " bacillus were isolated from the submucosa of the stomach and small intestine. The author considers that the disease may have been mistaken in the past for anthrax, blackleg or malignant oedema. As no specific serum was available, a mixture of blackleg and malignant oedema serum was used, which seemed to check the disease.

Transmission experiments were carried out with the organism isolated from these outbreaks. All attempts to infect sheep proved fruitless, but pigeons were found to be very susceptible to the bacillus and its toxin. A formalized vaccine was prepared from four-day broth cultures which, on its administration to pigeons, enabled them to withstand a certainly fatal dose of toxin. A specific antiserum was also prepared from a horse. The author suggests that both the serum and the vaccine could have a wide-spread use in practice, especially in the autumn and winter months when the disease appears to be more prevalent.—J. A. Nicholson.

Schnürer, J., & David, H. (1935). Schimmelpilzen bei einem Kalbe. [**Mycosis in a Calf**].—*Zlb. Bakt. I. (Ref.)* **118.** 555-556.

A brief note is recorded of a case of generalized mycosis in a calf. Infection was of intra-uterine origin. The fungus was isolated, cultivated and examined. In the absence of fructifications, classification was difficult, but the organism was tentatively included in the genus *Saprolegniales*. Members of this genus are known to produce diseases in fish, arthropods and plants.—E. J. Pullinger.

Benham, Rhoda W. (1935). **Cryptococci – their Identification by Morphology and by Serology.**—*J. infect. Dis.* **57.** 255-274. 13 figs., 5 tables. [Numerous refs.]

This is a report of a detailed study of the colony characteristics, fermentation reactions, serological reactions and pathogenicity of representative strains of

pathogenic and saprophytic cryptococci isolated from the human skin and intestinal tract. The author concludes by stating that to identify these organisms not only their morphological and cultural characteristics, but also their serological and biological reactions, should be studied. Virulent strains can only be determined by animal inoculation.—Gwilym O. Davies.

Gregory, P. H. (1935). **The Parasitic Activity of the Ringworm Fungi.**—*Trans. St. John's Hosp. derm. Soc., Lond.* pp. 56-65. [6 refs.]

In this paper the author discusses the relationship which exists between parasitic fungi and their hosts. He first of all points out that, of the tens of thousands of fungi known, only an insignificantly small number are parasites of the human skin. This is considered to be due to the unique ability of ringworm fungi to attack keratin by means of an enzyme. Although the keratolytic enzyme has not been isolated, there is strong circumstantial evidence for its existence. This enzyme is of a general nature and the selective way in which certain fungi restrict their activity to certain hosts or certain situations in a host is not due to specific keratolytic action. This is attributed to local inherent immunity of the tissues. Whether or not the presence of a fungus determines parasitism depends upon the resulting degree of reaction on the part of the skin. Allergic manifestations and even complete elimination of the parasite may follow. The most successful parasites are those which excite the least inflammation.—Gwilym O. Davies.

Klodnizky, N. N. (1935). Milieux colloidaux pour la culture de microbes. [**Colloidal Culture Medium for Bacteria**].—*Ann. Inst. Pasteur.* **55.** 486-490.

After many attempts at finding a medium in which anaerobes can be induced to grow in the presence of atmospheric oxygen, the author found the following agar-bouillon to be an excellent general medium for the growth of anaerobes and aerobes. It is simple to prepare and can be kept indefinitely. It consists of peptone-meat bouillon, pH 7·2 to 7·4, to which is added 0·1 per cent. agar, the final product being filtered through paper, whilst hot, and sterilized at 120°C.

The author also found that 0·1 per cent. agar added to Sabouraud's liquid medium gave good results in the cultivation and conservation of pathogenic fungi. —Gwilym O. Davies.

Romey, A., & Fricker, J. (1935). Absence de pouvoir antagoniste microbien dans la salive. [**The Absence of Bactericidal Power in Saliva**].—*C. R. Soc. Biol. Paris.* **120.** 887-890. [1 ref.]

Contrary to the results of Dold and Weigmann with diphtheria bacilli, the authors found that no specimen of the filtered saliva of 20 individuals, collected with precautions as to previous medication and smoking, had a differential inhibitory effect on the growth of *Streptococcus haemolyticus* obtained from the tonsils, *Staphylococcus aureus* from the saliva, *Str. faecalis* and *Bact. coli.* Half of the patients possessed good dentures, and half very bad dentures with or without pyorrhoea. —E. Weston Hurst.

DISEASES CAUSED BY PROTOZOAN PARASITES.

Eakins, H. S. (1935). **Murrina.**—*Vet. Bull. U.S. Army.* **29.** 295-309. [9 refs.]

Randall, R. (1935). **Murrina in Horses Experimentally Infected with Trypanosoma hippicum.**—*Ibid.* 321-331. 3 charts. [5 refs.]

" Murrina " is a name used by the natives of Panama to describe any severe

disease of the larger domestic animals, but has come to be applied specifically to equine trypanosomiasis due to *T. hippicum* infection. The first article gives a general description of this disease, which has extended from Panama as far as Santa Maria and Santiago. *T. hippicum* resembles *T. evansi* and some authorities believe that " murrina " is a modified form of surra. According to popular belief, the disease was brought to the Isthmus in a horse imported from South America, and existed prior to the first importation of Indian cattle. The classical vector of the disease is the vampire bat, but it can also be transmitted by flies and other agencies. Cattle, swine, sheep, deer and cats may act as reservoirs of infection. The classical symptoms are depression, intermittent fever, anaemia, partial depilation and posterior inco-ordination, but the latter is often absent, and infected animals may appear in excellent condition. As a practical means of diagnosis, successive examinations of thick blood films secured at seven-day intervals are sufficient for the detection of infected animals ; resort may also be made to guinea pig inoculation and to the complement-fixation test. For treatment, a fresh solution of 1 g. tartar emetic and 8 g. " naganol " in 400 c.c. sterile distilled water is given by intravenous inoculation in doses varying from 50 c.c. for a 100 lb. animal to 200 c.c. for animals of 600 lb. or over. Three injections at weekly intervals are said to give an average of 80 per cent. recoveries, and few recrudescences.

The second article records a study of the course of " murrina " in two artificially infected horses, blood samples being taken daily during the early stages of the disease, and later at frequent intervals till death. The examinations included total counts of red and white cells, a differential count of leucocytes, estimations of the percentage of haemoglobin, the complement-fixation reaction, the carbon dioxide capacity of the blood plasma, and the non-protein nitrogen, creatinine and sugar. The most marked alteration produced by the infection was a reduction in the carbon dioxide-combining capacity of the blood, which fell from 68 and 67 per cent. to 42·9 per cent. in one case and 14·7 per cent. in the other. Preterminal and terminal non-protein nitrogen readings indicated pathological changes in the kidneys that further embarrassed the alkali reserve. It was observed that the disease was characterized by progressive anaemia, and it is considered that the observations indicate that death is probably due to asphyxia from uncompensated acidosis.
—U. F. Richardson.

Berny, P., & Saint-Prix, M. (1935). Une épizootie à *Trypanosoma guyanense* au bourg de Régina (Guyane française). [*Tryp. guyanense* **Infection in Cattle in Regina, French Guiana**].—*Bull. Soc. Path. exot.* **28.** 708-710. [8 refs.]

The authors record outbreaks of disease in cattle, due to *T. guyanense* infection, at Regina in French Guiana, in which territory this trypanosome has not been recorded since 1919. The outbreaks followed the arrival of a consignment of cattle from Brazil. The trypanosome resembled *T. vivax* morphologically, and guinea pigs and rats proved resistant to inoculation.—U. F. Richardson.

Lerena, C. A. (1934). Informe sobre la compleja enfermedád del ganado vacuno de la republica de Venezuela, conocida con el nombre de " huequera " ó " cacho hueco ". [**Report upon the Complex Disease of Venezuelan Cattle known as " Huequera " or Hollow Horn**].—*Rev. Med. vet., B. Aires.* **16.** Nos. 4, 5 and 6. 46-52.

The author was asked to collaborate in an investigation of the above condition by examining material sent to him from Venezuela at his laboratory at Buenos

Aires. There was already a good deal of evidence that the disease was due to *Tryp. vivax* but, unlike this disease in other parts, there was in the Venezuelan disease a lesion in the horn, consisting of a rarefying osteitis of the cornual process of the frontal bone. Apart from this lesion and the pain resulting from it, the symptoms were consistent with a diagnosis of trypanosomiasis. The material received by the author comprised a horn, a femur and blood smears. The blood smears revealed parasites indistinguishable from *T. vivax*. The disease was successfully reproduced and the identity of the parasites confirmed. *Pseudomonas pyocyanea* was isolated from the bone-marrow of the femur. The relative importance of the two organisms cannot be estimated. Treatment with tartar emetic (3 mg. per kg. body weight) in an 0·5 per cent. solution is said to have been completely successful. Two successive daily doses were given intravenously.
—R. S. Roberts.

Pérard, C. H. (1935). Les coccidioses animales. Considérations sur la biologie des coccidies. [**Animal Coccidiosis. Biology of the Coccidia**].—*12th Int. vet. Congr. 1934.* **3.** 78-91. [26 refs.] [English, German and Spanish summaries : abst. from orig. in French].

This review of animal coccidiosis is almost identical with a former one by the same author [see this *Bull.* **5.** 620]. In the discussion which followed the reading of the paper, doubt was expressed that coccidial oocysts were killed by temperatures under 0°C. or by lack of oxygen, and the claim that a milk diet was efficacious in freeing the intestines from coccidia was also controverted. Simms and Wilson reported a method of immunizing calves and fowls against coccidia by administering oocysts which had been attenuated by exposure to potassium bichromate or copper sulphate.—U. F. Richardson.

Huff, C. G., & Bloom, W. (1935). **A Malarial Parasite Infecting all Blood and Blood-Forming Cells of Birds.**—*J. infect. Dis.* **57.** 315-336. 2 text figs., 41 figs. on 2 plates, 5 tables, 5 charts. [Numerous refs.]

This article records observations on canaries infected with *Plasmodium elongatum*. In contrast to other malarial parasites all stages of the asexual cycle of the parasite were found in erythroblasts, macrophages, stem cells, normoblasts, monocytes, plasma cells, thrombocytes, erythrocytes and myelocytes. Gametocytes were only found in normoblasts and erythrocytes. All the asexual stages of the parasite are spherical, except individual merozoites which are elongated and closely resemble those of coccidia. Some of the apparent differences between the morphology of the asexual stages of the parasite and those of other malarias in this study may have been due to the method of wet fixation in Zenker-formol fixing mixture which was adopted instead of the usual dry fixation. Observations made on the prevalence of various stages of the parasite indicated that there was a daily cycle with the peak of segmentation occurring between 8 and 10 a.m.—U. F. R.

I. Yakimoff, W. L. (1935). Les piroplasmoses. [**Piroplasmosis**].—*12th Int. vet. Congr. 1934.* **3.** 291-314. [English, German and Spanish summaries : abst. from orig. in French].

II. Hornby, H. E. (1935). **Classification of Piroplasms of Domestic Mammals.**—*Ibid.* 314-325. [French, German and Spanish summaries].

III. du Toit, P. J. (1935). **Anaplasmosis.**—*Ibid.* 325-345. 1 table. [Numerous refs.] [French, German and Spanish summaries].

I. The author reviews the subject of piroplasmosis in domestic animals and deals particularly with the problems presented in Russia and the recent research

work undertaken in that country. Dealing with the questions of classification and nomenclature, attention is drawn to the work of DENNIS who considers that the piroplasms are intermediate between the sporozoa and haemoflagellata, and to the work of REGENDANZ and REICHENOW who consider that they have nothing in common with either the sporozoa or flagellates but are closely related to rhizopoda. The nomenclature adopted is that suggested by MESNIL, except that the genus *Babesiella* is divided into the two genera *Babesiella* and *Françaiella*, the members of the latter genus being distinguished by a central situation of the parasite in the corpuscle, and a resistance to the action of trypan blue. The relationships between the various forms of bovine *Babesia*, and the validity of such species as *Piroplasma australe* of Brazil, *Microbabesia divergens* of Java and *Nuttallia minor* of Transcaucasia are discussed. *P. australe* is said to be the causal organism of the disease " tristeza " in Brazil, and to be immunologically distinct from *Babesia bigemina* of the United States of America and also from the redwater parasite of the Argentine. It is characterized by considerable polymorphism, a high proportion of chromatin and a peculiar development cycle in the vertebrate in which some of the forms encountered resemble those of *Theileria*. It is considered that *Microbabesia divergens* should be classified as a *Françaiella*, and that the validity of the species *N. minor* requires confirmation.

Under the heading of diagnosis, attention is drawn to the work of KASANSKY who claims that, by the centrifugation of equine blood, it is possible to detect piroplasms in smears made from the deposit, although direct blood smears may be negative to microscopic examination.

Immunity and treatment are discussed at some length and it is pointed out that premunity may be shortlived and that treatment may be followed by relapses or reinfections. Attention is drawn to the value of " icthargan ", other silver derivatives and " todorit " in the treatment of the small babesia of cattle and of nuttallia infection in the horse.

Tick transmission is discussed, and the danger of assuming that a piroplasmosis will not spread in the absence of the natural vector is illustrated by the experimental transmission of American redwater by both *Haemophysalis cinnabarina punctata* and *Ixodes ricinus* in Germany.

II. This paper briefly discusses the problem which confronts an ordinary worker who wishes to refer to the parasites with which he is concerned by names which will be understood by fellow-workers. The case for the use of the name *Babesia* is discussed and the objection to this name, advanced by MESNIL, is not considered adequate to allow of the adoption of the name *Piroplasma* in contravention of an agreed international rule.

The author divides the suborder Piroplasmidea into the three families Babesiidae, Theileriidae and Anaplasmidae. The inclusion of anaplasms amongst the Piroplasmidea is put forward in support of the views of DU TOIT that " almost in every respect the anaplasmata behave like the piroplasmata ; the symptoms and pathological lesions they produce are in many respects similar ; their mode of transmission through ticks is the same ; the epizootology of the two diseases is practically identical ; and immunologically they bear a great resemblance to each other ". DU TOIT, however, admits that " the further question whether these parasites are protozoa or not remains to be answered ".

The division of the family Babesiidae into the genera *Piroplasma* and *Babesiella* is not considered as justifiable but the genus *Nuttallia* is accepted in view of the sharp difference between the method of division into two exhibited by *Babesia*, and into four exhibited by *Nuttallia*.

With regard to species, the author considers that " until the full life history

of each piroplasm has been worked out both in the vertebrate host and invertebrate vector, the true relationships between these protozoa cannot be realized and classification must be speculative." In some groups there are large series of forms amongst which certain defined species can be accepted whilst others which differ slightly must be referred to as " near " such and such a species. This may be unsatisfactory but seems preferable to recognizing an infinite number of species to cover a whole range of gradation between such forms as *Theileria mutans* and *Th. parva*. The paper is summarized by the following classified list of the best known piroplasms :–

Family.	Genus.	Species.
Babesiidae Poche, 1913.	*Babesia* Starcovici, 1893.	*bigemina, bovis, major, caballi, canis, gibsoni, motasi* and *ovis*.
	Nuttallia França, 1910.	*equi*.
Theileriidae du Toit, 1918.	*Theileria* Bettencourt, França and Borges, 1907.	*parva, dispar, annulata, mutans, hirci* and *ovis*.
Anaplasmidae.	*Anaplasma* Theiler, 1910.	*marginale, centrale* and *ovis*.

III. This review of the subject of anaplasmosis in domestic animals touches lightly on those aspects which are dealt with in text-books, but deals critically with the important problems which have arisen in recent studies. Anaplasmosis is said to be essentially a disease of tropical and semitropical countries in which, however, high plateaux and arid regions are usually free from infection owing to the absence of the transmitting tick. Usually the same species of ticks transmit anaplasmosis and piroplasmosis, but in North America the disease has appeared in a number of states which are free from redwater. Support for the theory that the anaplasma bodies are parasitic is found in the fact of the reappearance of the bodies on splenectomy of a carrier animal and in the existence, in cattle, of two strains of the organisms. Transmission of the disease can be accomplished by ticks belonging to the genera *Boophilus*, *Rhipicephalus*, *Hyalomma*, *Ixodes* and *Dermacentor* and, in the case of *Boophilus* and *Ixodes*, infection passes through the egg of the tick. Outside tick transmission, the disease can be conveyed mechanically by surgical instruments and, in one case, it has been successfully transmitted experimentally by biting flies.

Sheep and goats can be infected with *A. marginale* of cattle but the organism cannot be detected in their blood, although this is infective for cattle after two months but not after four months. Various species of antelopes have also been proved susceptible and Neitz and du Toit were able to obtain a pure strain of *A. marginale* or *A. centrale* by inoculating antelopes with cattle blood containing *B. bigemina*, *Th. mutans* and *A. marginale* or *A. centrale*, the antelopes proving resistant to the piroplasms.

No satisfactory treatment is recognized for anaplasmosis, though Parkin claims encouraging results with mercurochrome-220. Successful attempts to confer immunity to the disease have been claimed by the use of the mild *A. centrale* strain of the parasite, by a strain reduced in virulence by passage through sheep, and by the utilization of blood from an animal in the incubation stage of the disease. The author, however, has not found that there was any decrease in virulence in inoculations of blood from animals in the incubation period.

Anaplasmosis of sheep has been recorded from South Africa, Algeria and Palestine, but while in South Africa the infection can only be detected by splenectomy, and in Algeria the disease may be severe but rarely fatal, yet in

Palestine heavy losses have been recorded. In regard to the so-called "anaplasma" in other animals, the opinion is expressed that these structures are not related to *A. marginale* of cattle or *A. ovis* of sheep.

In the discussion which followed these papers, ROSENBUSCH stated that, in the Argentine, anaplasmosis was largely confined to tick-infested areas, but outbreaks which had occurred outside those areas had been ascribed to mechanical transmission. There appeared to be no indication that the numerous biting flies were responsible for the spread of the disease. Work on tick transmission had shown that a high atmospheric temperature was required for this process. STILES drew attention to the successful transmission of anaplasma by biting flies which had been obtained in the United States of America. SAN MIGUEL observed that, in Chile, anaplasmosis was practically confined to working oxen and that it was believed that transmission mainly occurred through the use of goads. When goads were not used no spread of disease occurred. It appeared that biting flies were not a factor in the spread of the disease in Chile.

DAUBNEY preferred to reserve judgement on the inclusion of anaplasma in the piroplasma group. He explained the problems that arise in connexion with piroplasmosis and anaplasmosis in an enzootic area, and the effect of dipping and partial, or complete, tick eradication in such an area.

METTAM drew attention to the discovery of bodies indistinguishable from the schizonts of *Theileria* in the brains of cattle infected with " turning sickness " in Uganda. It was not possible to say whether this condition represented a breakdown in immunity to East Coast fever or whether it was an infection of recovered animals either with a virulent strain or with a new species of *Theileria*. All attempts at transmission have failed.—U. F. RICHARDSON.

SCHWETZ, J. (1934). Sur une épizootie de theileriose mortelle (East Coast fever) à Stanleyville (Congo belge). [**An Outbreak of East Coast Fever at Stanleyville, Belgian Congo**].—*Ann. Parasit. hum. comp.* **12.** 228-247. 6 figs. [9 refs.] [A fuller version appears in *Bull. agric. Congo belge.* **26.** 88-129].

These two articles record observations made on an outbreak of theileria infection in cattle at Stanleyville, and are identical except that the second gives fuller details of the pathological findings in individual cases, and contains *verbatim* reports from the laboratories to which material was sent for examination. The outbreak of disease, which was believed to have been due to infection introduced by cattle brought from the Sudan, caused a loss of nearly 50 per cent. in a herd of 300 animals in three months, after which it was arrested by dipping.

The disease was diagnosed as East Coast fever, but was atypical in that lachrymation, tumefaction of eyelids, opacity of the cornea and blindness were prominent symptoms. Enlargement of the lymph glands, though encountered in calves, did not occur in the affected adult animals, and distinct anaemia was present, anisocytosis being particularly noticeable. The corpuscles did not show a high percentage of parasitic infection (2·7 to 15 per cent.), but Koch's bodies were numerous in the peripheral blood. Oval and round forms of parasites were exceptionally numerous in certain cases, and the proportion of these forms to the bacillary forms might vary considerably in smears taken from the same animal at different times. Blue bodies were more readily found in smears from the spleen and lymph glands than in smears from other organs, and the liver was found to be unsuitable for the detection of these bodies. One case is recorded in which blue bodies were found in material from the kidneys, but could not be detected in other organs.

The nature of the parasite concerned is discussed, and the author, in agreement with DU TOIT, PARROT and CARPANO, to whom material was sent, considers that

the infection was due to *Theileria parva*, though DU TOIT qualifies this by the suggestion that it would probably prove to be due to one of the intermediate forms of theileria. He also suggests that the ocular symptoms may have been due to causes other than the piroplasm infection.

The virulent theileria infection caused relapses to pre-existing infections with *Babesia bigemina* and *Th. mutans*, and the author points out that the resulting mixed infections may have somewhat confused the parasitic picture, but he also points out that the tadpole and comma forms, which in North Africa are said to be typical of *Th. dispar* infections, are encountered in Central Africa associated with *Th. mutans*.—U. F. RICHARDSON.

STILES, G. W., Jr. (1935). **Anaplasmosis Observed in Wyoming.**—*J. Amer. vet. med. Ass.* **87.** 579-582. [6 refs.]

The author records the detection of anaplasmosis in two different localities in the state of Wyoming, United States of America. In one outbreak the mortality was 50 per cent. of the affected animals. Several ticks of the species *Dermacentor andersoni* were collected on one dead cow, and these are being used for further experimental study.—U. F. RICHARDSON.

GILLAIN, J. (1935). Note sur la présence d'Aegyptianella pullorum chez les poules au Congo belge. [*Ae. pullorum* **in Fowls in the Belgian Congo**].—*Ann. Soc. belge Méd. trop.* **15.** 299-300.

A record of aegyptianella infection in the Nioka region, where it appears to be wide-spread. Indigenous fowl are fairly resistant but, in imported birds, the mortality is from 5 to 8 per cent. It is not associated with *Spirochaeta gallinarum*. *Ae. pullorum* is transmitted by *Argas persicus*.—GWILYM O. DAVIES.

DISEASES CAUSED BY VIRUSES.

FRENKEL, H. S., & VAN WAVEREN, G. M. (1935). Over het kweeken van mond- en klauwzeermetstof in vitro. [**Culture of Foot and Mouth Disease Virus**]. —*Tijdschr. Diergeneesk.* **62.** 233-243. 1 fig. [7 refs.] [English, French and German summaries : abst. from orig.] [Also published separately as paper from the Staatsveearts. Onderzoek.-inst. (1935). pp. 13]. [These publications have no serial number. They appear irregularly].

The authors were unable to obtain cultures of foot and mouth disease virus in fibroblast cultures ; it appears that epithelial tissue is indispensable. This was also the experience of other workers. The authors operated with a modification of the apparatus devised by DE HAAN, and used for their experiments fibroblast tissues of rabbits, pigs and calves, with no result. Cultures were then made according to Carrel's method modified by MAITLAND, using embryonic bovine skin (instead of embryonic guinea pig skin), Tyrode solution and fowl plasma. In this medium the virus could be cultivated in the incubator for eight generations over 28 days, without decrease of the virulence.—J. VAN DER HOEDEN (UTRECHT).

FRENKEL, H. S., & VAN WAVEREN, G. M. (1935). I. Over het kweeken van mond- en klauwzeersmetstof op huid-explantaten van runder- en schapen-embryo's. II. Infectie- en immunisatieproeven met het in vitro gekweekte mond- en klauwzeervirus. [**I. Culture of Foot and Mouth Disease Virus in Skin Cultures of Cattle and Sheep Embryos. II. Infection and Immunity Tests with Foot and Mouth Disease Virus Grown** *in vitro*].—Paper from

Staatsveearts. Onderzoek.-inst. pp. 18. 5 tables. [5 refs.] [English, French and German summaries: abst. from orig.] The Hague: Algemeene Landsdrukkerij. [8vo].

I. Since the work described in the previous abstract was done the culture has been further grown over a total of 27 passages in 104 days. Fowl plasma was used in the cultures but, as it is troublesome to obtain, an attempt was made to use agar (0·75 per cent. in Ringer's fluid) as a substitute: this was successful, a total of 18 passages in 70 days being obtained up to the time of writing. It was observed, however, that in virus cultures connective tissue and epithelial cells proliferate less readily in the presence of agar than in the presence of fowl plasma.

Virus was also cultured in a fluid medium composed of virus filtrate 1, embryo calf tissue 1, ox serum 5 and Tyrode solution 5 for ten passages in 38 days, and in ox serum and Tyrode solution and in Tyrode solution alone, using virus-skin implants for four passages over 11 days.

Sheep embryo skin, fresh or after keeping for seven days in cold store, proved to be as useful as calf embryo skin; sheep cotyledon tissue in fowl plasma and Tyrode solution also gave positive results, but was far inferior to skin tissue.

II. Eight cattle and two pigs were successfully infected by cultured virus used at the eighth to the 18th passage in culture. Intramucous infection at the interdental space of the lower jaw, followed by a second dose intravenously, conferred a useful degree of immunity so that the resultant antiserum protected guinea pigs against artificial infection (doses and titres varying).

It is suggested that this method of immunizing cattle will greatly simplify the production of antiserum for field use.—J. E.

I. VAN WAVEREN, G. M. (1934). Pogingen tot het verwekken van een mond- en klauwzeer-encephalitis bij cavia, konijn, witte muis, kalf en varken. [**Attempts to produce Encephalitis in Guinea Pigs, Rabbits, White Mice, Calves and Pigs, with the Virus of Foot and Mouth Disease**].—*Versl. werkzaam. Staatsveearts. Onderzoek. -Inst. 1933-34.* pp. 29-39. [13 refs.]

II. VAN WAVEREN, G. M. (1934). Intra-testiculaire entingen met mond- en klauwzeer virus bij konijn en cavia. [**Intratesticular Infection of Rabbits and Guinea Pigs with the Virus of Foot and Mouth Disease**].—*Ibid.* pp. 40-45. [5 refs.]

III. FRENKEL, H. S., & VAN WAVEREN, G. M. (1934). Vermeerdert het virus mond- en klauwzeer zich in het zich ontwikkelende kippen-ei? [**Does Foot and Mouth Disease Virus develop in the Eggs of Hens?**]—*Ibid.* pp. 46-52. 2 tables. [3 refs.]

IV. FRENKEL, H. S. (1934). Mond- en klauwzeervirus in kunstmatig verwekte blaren. [**Foot and Mouth Disease Virus in artificially formed Vesicles**].—*Ibid.* pp. 57-83. 10 tables, 4 graphs.

V. FRENKEL, H. S. (1934). Over het kweeken van mond- en klauwzeervirus op niet-pathogene microörganismen. [**Growth of Foot and Mouth Disease Virus on Non-Pathogenic Bacteria**].—*Ibid.* pp. 88-92. [2 refs.]
[English, French and German summaries: abst. from orig.]

I. Intracerebral inoculation of rabbits and mice with virus of foot and mouth disease did not result in infection as indicated by the formation of vesicles. The guinea pig, calf and pig could be infected by this type of inoculation though intradermal, intravenous or intramuscular inoculations were more satisfactory. The injection of virus into animals which had been splenectomized or otherwise treated to lower their resistance made no difference to the course of infection, nor did the simultaneous injection of "neuro-lapine" (small pox virus adapted to rabbit

brain by passage) carbon or yeast cells affect the issue. Purification of the virus with ether enabled it to survive within the mouse for as long as three days. During intracerebral passage for four generations no adaptation of virus to brain substance occurred.

II. Intratesticular injection of virus into guinea pigs and rabbits produced no localized orchitis except when contaminated material was injected. Rabbits showed no reaction to such injections, whilst in guinea pigs normal lesions appeared at the predilection sites. This route of inoculation showed no superiority over intramuscular inoculation, nor did damage to the reticulo-endothelial system affect the issue.

III. The inoculation of the chorio-allantoic membrane of eggs with virus of foot and mouth disease produced variable results when eggs were subsequently tested for survival of the virus. Both guinea pig and porcine virus definitely survived within some eggs for a period of 48 hours at 40°C. Out of 84 tests virus survived in 11 eggs. Multiplication of virus was not demonstrated. Out of three series of attempts at sub-culture from egg to egg, one attempt failed completely, in another series a single sub-culture was successful, and in the third series a single sub-culture was successful though it had not proved possible to demonstrate virus in the primary egg culture by animal inoculation.

IV. An attempt was made to increase the yield of virus harvested from vesicles on the skin of pigs by producing artificial vesicles on the hairy parts of the skin [non-predilection sites] through the use of blistering ointments. Virus was administered intravenously or intradermally at the same time as the blister. The virus content of such artificial vesicles at any time bore a close relation to the virus content of the blood, though the strength of the virus in the vesicles was generally greater. It is considered that the method in its present form is of little value from a practical point of view.

V. The author failed to demonstrate growth or even survival of virus retained *in vitro* together with cultures of non-pathogenic micro-organisms.
—E. J. Pullinger.

Daubney, R. (1934). **Rinderpest.**—*Rep. Dep. Agric. Kenya, 1933.* pp. 358-365. 2 tables.

Tests have been made of the effect of merthiolate (sodium ethyl-mercurithiosalicylate) upon the virus of rinderpest. This compound has recently been introduced as an antiseptic for the preservation of biological products such as vaccines and sera. Jamieson and Powell [(1931). *Amer. J. Hyg.* **14.** 218.] reported that merthiolate sterilizes vaccines and sera when added in concentrations of 1 : 5,000 to 1 : 10,000, and that bacteriophage is unaffected. Daubney finds that rinderpest virus extracted from spleen tissue is still viable after 24 days' exposure to merthiolate in a dilution of 1 : 5,000 at ± 2°C. Use has been made of this antiseptic in arranging tests of rinderpest vaccine prepared with concentrations of formalin insufficient to effect the destruction of contaminating bacteria. In recent years the vaccine prepared at Kabete has been treated with 1 per cent. formalin, in order to avoid the risk of occasional loss from bacterial contamination, although early work indicated that high concentrations of formalin furnished a less efficient vaccine than concentrations of the order of 1 : 1,000. An experiment performed in 1933 on a uniform group of 32 cattle confirmed the results of earlier experiments, and showed that the addition of merthiolate as an antiseptic in a concentration of 1 : 10,000 had no deleterious action on the vaccine.

The photodynamic action of certain dyes upon the rinderpest virus was examined, with particular reference to the effect of the practice of adding trypan

blue to virulent rinderpest blood with the object of destroying *Babesia bigemina*. It was anticipated that the situation of the virus within the leucocytes would afford adequate protection against the photodynamic action of dyes, and this proved to be true. Trypan blue, in dilutions up to 2 per cent., does not exert any photodynamic effect upon the virus in bright sunlight.

During the year, immunity tests have been carried out upon 13 cattle vaccinated in 1927. The cattle tested were those remaining over from a batch of 167 animals treated first with a completely inactivated vaccine, followed seven days later by a partially inactivated vaccine. The final test was made 63 months after vaccination ; of the 13 animals, all of which were pregnant cows, 11 gave no reaction to virus, one gave a temperature reaction only and one contracted a mild clinical attack of rinderpest. Eight of the cows calved normally during the period of contact exposure prior to the inoculation of virus. Of the total of 167 animals treated by this method in 1927, 66 have now been tested with virus, at intervals ranging from 12 and a half to 63 months ; one animal only has contracted clinical rinderpest after the test inoculation, six have shown mild temperature reactions and the remainder have been completely resistant. It is concluded that treatment with a completely inactivated vaccine, followed by a vaccinating dose of active spleen virus or of partially inactivated virus, will provoke an immunity serviceable for a period in excess of five years. Laboratory experiments indicate that for reinforcement of the first vaccination it may not be necessary for the dose of virus to be a vaccinating one, and a large-scale experiment to test this possibility is now in progress.

Further data have been accumulated concerning the duration of the immunity provoked by treatment with inactivated vaccine alone. After a single dose of 20 c.c. of inactivated vaccine, immunity appears to be waning at 13 months. After two doses, containing together 3·7 g. of spleen pulp given at seven days' interval, the degree of protection remaining at two years appears to be negligible. Treatment with the same amount of spleen pulp divided into three doses appears to give a higher degree of immunity since, of six animals tested with virus two years after such a vaccination, none developed clinical rinderpest and four completely resisted the test inoculation. Further tests are in progress.

Jacotot, H. (1935). Influence de la dose du virus d'épreuve sur le comportement des animaux vaccinés contre la peste bovine. [**The Influence of the Dose of Test Virus on the Degree of Immunity in Vaccination against Rinderpest**]. —*Bull. Soc. Path. exot.* **28.** 689-692. [1 ref.]

This article records observations on four calves immunized with a toluol-glycerol vaccine tested with varying doses of rinderpest virus. Two animals gave no reaction to a virus injection of 2 c.c. of blood diluted to 1 : 1,000 given a fortnight after vaccination, but 50 c.c. of undiluted virulent blood caused temperature reactions in the other two animals. Virus injections were repeated at five and six weeks after vaccination, reactions being provoked by large doses of blood and virus being recovered from one reacting animal. A virus injection of 2 c.c. of blood six months after vaccination caused a reaction in two animals which had previously received small doses of virus, but failed to produce a reaction in animals which had received large doses of virus.—U. F. Richardson.

Jacotot, H., & Le Roux, G. (1935). La vaccination intradermique en matière de peste bovine. Recherches expérimentales. [**Experiments on Intradermal Vaccination against Rinderpest**].—*Bull. Soc. Path. exot.* **28.** 753-762. [4 refs.]

This article records experiments carried out with a glycerol-toluol vaccine against rinderpest to ascertain whether the advantages claimed for intradermal inoculation could be confirmed. Vaccines were tested to ascertain the minimum immunizing doses before using them in experiments, and inoculations were made by injecting small quantities in several places to ensure maximum absorption. The results indicated that intradermal inoculation possessed no advantage over subcutaneous inoculation either as regards the dose of vaccine required, the rapidity of the production of immunity or its duration.—U. F. RICHARDSON.

DELPY, W. L. (1935). La peste bovine en Perse. [**Rinderpest in Persia**].—*Rev. gén. Méd. vét.* **44.** 577-601. 1 table. [Numerous refs.]

This article discusses the control of rinderpest in Persia, where it has been considered advisable to dispense with the enforcement of segregation and to rely mainly on the production of immunity. Methods of conferring immunity are discussed. Serum-alone is dismissed as too expensive and too fleeting, whilst the serum-simultaneous method is also expensive, requires experienced inoculators and is unpopular owing to serious losses in the past. The goat-virus method was not adopted owing to the difficulty of maintaining virus in goats, a large number of which prove insusceptible. Methods of preparing vaccines are discussed at some length and preference is given to the use of formolized vaccine, owing to the simplicity and cheapness of its preparation and administration. Subcutaneous inoculation is preferred to intradermal injection as it requires less skill on the part of the operator.

The vaccines in use in Persia are made by macerating the spleen, lungs, testicles and lymph glands from an animal suffering from rinderpest, at any stage of the disease preceding collapse, with normal saline to which 6 per 1,000 formalin has been added. After 48 hours the vaccine is strained through coarse cloth and the filtrate is used in a dose of 10 c.c. for calves and 35 c.c. for adult cattle. This liquid vaccine is said to retain its immunizing properties for two months, and to confer immunity for 12 months.

The solid residue retained by the cloth is dried in electric stoves, ground, sifted through a silk sieve and stored in sachets of impermeable paper in quantities of 50 g. The contents of each packet are dissolved in 500 c.c. of distilled water for use. The dose of this dried vaccine is 0·5 g. Immunity is not conferred until 12 days after vaccination, and the injection produces a swelling which persists for about 12 days. It is claimed that this vaccine retains its value for a year, and that its preparation is simpler than that of other dried vaccines, as the addition of formol avoids the necessity for strict asepsis. On an average, 70 doses of liquid vaccine and 140 doses of solid vaccine are produced from one calf, so that the cost per dose is about 1/200th of the price of the calf. Rinderpest control has been reduced to the confirmation of outbreaks by veterinary officers and the vaccination of in-contact stock by inoculators, all compulsion being avoided. In 1931 the country was faced with a severe epidemic, but by 1933 the incidence of disease had been reduced to border outbreaks and to one outbreak near Teheran caused by the movement of slaughter cattle from the interior.—U. F. RICHARDSON.

ALEXANDER, R. A. (1935). **Studies on the Neurotropic Virus of Horse-sickness. I. Neurotropic Fixation. II. Some Physical and Chemical Properties. III. The Intracerebral Protection Test and its Application to the Study of Immunity. IV. The Pathogenesis in Horses.**—*Onderstepoort J. vet. Sci.* **4.** 291-388. 39 tables, 9 charts. [Numerous refs.]

I. After briefly describing the early attempts at transmission of horse-sickness

to animals other than the horse, the author records the successful transmission of the disease to the white mouse by intracerebral inoculation, which was accomplished by NIESCHULZ and himself independently. The technique of the fixation of the virus in mice is described, the use of half-grown animals being recommended on account of the softness of the skull. The use of defibrinated blood for inoculation instead of citrated or oxalated blood is recommended on account of the toxicity of the anticoagulants. It may be necessary for several generations of the virus to be passaged in mice before it produces a mortality of 100 per cent. The subcutaneous and intramuscular methods failed in mice, but the intraperitoneal route may be successful if the brain is injured at the same time. A description of the symptoms shown by infected mice is given. The virus is almost entirely neurotropic, very little being found in any of the internal organs. The transmission of the virus to guinea pigs, rats, multimammate mice and gerbilles is described. Transmission to the rabbit was unsuccessful.

II. The keeping properties of the virus are described, and the rapid deterioration in normal saline is recorded. This could be prevented by the addition of 10 per cent. of horse serum. A pH of 5·9 is the maximum degree of acidity which can be tolerated. Desiccation does not destroy virus in mouse brains, but appears to act as a preservative. With regard to preservatives, ether would appear to be the only one of value. The virus was found to be filtrable through a Seitz EK disc. Methylene blue has a marked photodynamic inactivating effect.

III. The method of producing a stable mouse-brain antigen for antigen-antibody neutralization tests is described. After immunization with attenuated neurotropic virus, the antibody titre of the serum only reaches its highest point after about 200 days. By the serum-virus method the peak is reached after about 100 days. A titre of a high level is not obtainable. The titre of the serum tends to fall, but may remain fairly high for up to 300 days. A similar slow development of antibodies has been recorded in immunization with *Asterococcus mycoides* cultures in contagious bovine pleuro-pneumonia. The serum neutralization test proved of great value in the study of different virus strains. It was found that repeated injections of neurotropic virus caused the production of a high titre serum. An *in vitro* test to replace the biological one could not be developed.

IV. In discussing the pathogenesis of the disease in horses inoculated with neurotropic virus, it was shown that it might be present in the blood, the amount varying with the severity of the reaction. The intracerebral inoculation of horses with the neurotropic virus did not produce a specific encephalitis but resulted in a mild reaction with subsequent immunity.—E. M. ROBINSON.

ARGUN, T. (1935). Beiträge zur infektiösen Bronchitis der Pferde und zur Behandlung mit Aetherinjektionen. [**The Treatment of Infectious Equine Bronchitis with Ether Injections**].—*Wien. tierärztl. Mschr.* **22.** 458-462. 1 fig. [14 refs.]

An account of an outbreak of equine respiratory disease in Turkey. It was clinically similar to infectious bronchitis (Hoppegarten cough) and rapid recovery is said to have occurred after treatment with daily intramuscular injections of a mixture of 5 c.c. each of ether and olive oil.—J. E.

I. VON MÓCSY, J. (1935). Ansteckende Blutarmut der Pferde. [**Equine Infectious Anaemia**].—*12th Int. vet. Congr. 1934.* **2.** 282-292. [English French and Spanish summaries : abst. from orig. in German].

II. KRÁL, F. (1935). L'anémie infectieuse des chevaux. [**Equine Infectious Anaemia**].—*Ibid.* 293-317. [English, German and Spanish summaries : abst. from orig. in French].

III. —. (1935). **Discussion of Papers on Infectious Anaemia of Horses.**—*Ibid.* 317-319.

I. The aetiology of the disease was discussed and the speaker concluded that, whilst the causal agent is filtrable in character, it is not yet certain whether it is a small living organism or a non-living irritant substance. The causal agent finds ingress into the body *via* the alimentary canal as well as through the agency of blood-sucking insects. It is emphasized that no absolutely pathognomonic symptoms or *post-mortem* lesions occur, consequently diagnosis must be based upon the summation of all evidence whether anamnestic, clinical or laboratory in nature. Laboratory tests such as the measurement of the rate of sedimentation of red blood cells or the estimation of the colloid-lability of serum proteins are only of value as confirmation of clinical evidence. In the absence of very definite positive clinical evidence, subinoculation of susceptible horses is the only reliable diagnostic procedure.

II. In a general discourse on the condition, it was again stated that little is known of the general nature of the causal agent beyond the fact that it is filtrable and highly resistant. It was considered that the greatest source of virus is the blood and urine. Though infection may occur as a result of direct or indirect contact or through insect vectors, it is not known which of these constitutes the most important method of spread. It was again emphasized that the various diagnostic laboratory tests recommended in connexion with this disease are only of slight symptomatic value, indicating the presence of particular symptoms, and are non-specific. It was stated that, whilst apparent cures may be effected, true cure with loss of potential infectivity has not been recorded.

III. In the discussion it was stated that in Norway certain grazing tracts offer specially favourable conditions for the diffusion of virus. These areas consist of well-wooded mountainous country with a somewhat humid atmosphere. On dry, treeless mountain tracts the disease did not spread.

Discussing the diagnosis, it was stated that liver smears can be made by collecting material from the living animal with the aid of a special trochar. A reliable diagnosis can almost always be made if the results of a histological examination of both the liver and kidneys are correlated and analysed.—E. J. PULLINGER.

FAURE, L. (1935). Contribution à l'étude des modes d'infection dans l'anémie infectieuse des équidés. [**Methods of Infection in Equine Infectious Anaemia**].—*Rev. vét. milit.* **19.** 209-212.

This is a short account of three observations made with a view to confirming accepted opinions on the methods of infection in equine infectious anaemia. A healthy horse, stabled in an infected stall and provided with infected food and bedding, developed typical symptoms of the disease 38 days later, suggesting to the author infection by the digestive route. Infected serum applied to an artificial wound on a healthy horse was followed by general infection ten days later. A healthy horse which received four intravenous injections of blood taken from an apparently cured case showed symptoms of the disease 18 days later. [The data on which conclusions are drawn appear to be inadequate].—C. DAVENPORT.

OELLERICH. (1935). Epidemiologische über die ansteckende Blutarmut. [**The Epidemiology of Equine Infectious Anaemia**].—*Berl. tierärztl. Wschr.* **51.** 712-714.

Epidemiological problems associated with this disease are discussed. The main obstacle to successful control of the condition is the lack of a reliable method of diagnosis. In the absence of such a method it is frequently impossible to enlist

the whole-hearted co-operation of horse-owners in carrying out precautionary measures, which sometimes include the slaughter of animals which appear to be healthy.—E. J. Pullinger.

Ishii, S., & Nakamura, N. (1935). **On the Relationship of the So-called " Histiozytäre Zellen " to the Anaemia from the Haematological Observation of the Infectious Anaemia of Horses.**—*J. Jap. Soc. vet. Sci.* **14.** 340-356. 11 tables. [Numerous refs.] [In Japanese : abst. from English summary].

Blood counts, if made during the febrile stage and again within ten days after the fall of fever, seem to warrant the following conclusions with regard to the diagnosis of equine infectious anaemia :– (1) that oligocythaemia of over one million red cells and an increase of histiocytes by 5 per cent. or more indicate great probability ; (2) that considerable significance should be attached to either a fall of 0·5 to one million in the red cells together with an increase of histiocytes by 5 per cent. or more, or to a diminution of more than one million erythrocytes with an increase of 3 to 5 per cent. of histiocytes, and (3) that oligocythaemia of 0·5 to one million red cells, together with an increase of 3 to 5 per cent. of histiocytes, indicate only slight cause for suspicion.—J. W. Emslie.

Ten Broeck, C., Hurst, E. W., & Traub, E. (1935). **Epidemiology of Equine Encephalomyelitis in the Eastern United States.**—*J. exp. Med.* **62.** 677-685. 3 figs., 1 table. [12 refs.]

Like the western type of equine encephalomyelitis, the eastern type is seasonal and occurs between August and October. In the districts covered by the authors, winter cases have not been recorded. Unlike the western disease, this type is closely related, although not strictly limited, to salt marsh areas and the great majority of cases occur within two miles of the coast line. From a study of these outbreaks the authors are inclined to the view that transmission is by biting insects and not by contact. Determinations of the virus in the blood stream of experimentally infected horses show that it is present during the first febrile reaction, but decreases rapidly and is usually absent 24 hours before the onset of symptoms. This is believed also to occur in natural cases.

The suggestion is made that the disease is not primarily a disease of horses and that the horse is a secondary host which becomes affected from another species.
—Gwilym O. Davies.

Merrill, M. H., & Ten Broeck, C. (1934). **Multiplication of Equine Encephalomyelitis Virus in Mosquitoes.**—*Proc. Soc. exp. Biol., N.Y.* **32.** 421-423. [4 refs.]

Working with *Aedes sollicitans*, which had fed on animals infected with the virus of equine encephalomyelitis, the authors were able to show, by titration of a suspension of a given number of insects, a greater concentration of virus at five days than immediately after feeding.

In other experiments additional evidence of the multiplication of the virus in mosquitoes was obtained. Thirty female *A. aegypti*, infected five days previously by feeding on brain virus, were suspended in a mixture of 4 c.c. salt solution, 1 c.c. normal horse serum and 5 c.c. defibrinated horse blood. Cotton wool was moistened with the suspension and, after the addition of a little sugar, female *A. aegypti*, which had been starved, were given the opportunity to feed.

At six to seven-day intervals, mosquitoes from the last feedings were ground up into suspension and fresh ones were fed as above. The method was carried on in series through ten lots of mosquitoes. Virus was present in the last suspension

of crushed mosquitoes and it was concluded that multiplication had taken place. Tests showed that mosquito passage virus did not differ from original virus. Guinea pigs were readily infected by bites from mosquitoes carrying the passaged strain. The virus appeared to be distributed throughout the bodies of the mosquitoes and was demonstrated by guinea pig inoculation in suspensions of legs, body fluid, heads, thoraxes and abdomens. The virus was harmless to the mosquitoes ; the mortality in the cages containing infected mosquitoes was no higher than in those containing normal ones.—D. R. Wilson.

Remlinger, P., & Bailly, J. (1935). Quelques symptômes de l'encéphalomyélite expérimentale des équidés. (Virus argentin). [**Experimental Encephalomyelitis of Horses (Argentine Virus)**].—*Bull. Acad. vét. Fr.* **8.** 420-428. 2 figs., 4 graphs. [3 refs.]

In this study of equine encephalomyelitis, the authors used the Argentine strain of virus, serologically identical with the Californian virus of Meyer, Haring and Howitt. The introduction reads as though the disease were identical with the encephalitis of Moussu and Marchand [of which there is no evidence]. The much shorter incubation period and course of the disease, together with the greater range of susceptible animals (guinea pig, pigeon, rabbit, mouse, rat, goat, dog, cat, hedgehog, etc.), with the guinea pig as the experimental animal of choice, distinguish it from Borna disease. Infection follows inoculation by many peripheral routes as well as intracerebrally. A preliminary rise of temperature, unaccompanied by general disturbance, is followed within one or two days by nervous symptoms, partly of excitation, partly of paralysis. In a donkey, a dog and a cat, the body lay immobile on the ground while the limbs executed continuous " pedalling " movements resulting, after a time, in severe traumata from friction. Indications of similar movements were noted in guinea pigs and rabbits. Strikingly subnormal temperatures preceded death. The long agonal stage (four to five days) contrasts with the sudden termination in Aujeszky's disease.—E. Weston Hurst.

Klobouk, A. (1935). K otázce aktivní immunisace proti obrně vepřů (těsínské memoci). [**Immunization against Enzootic Encephalomyelitis in Swine**].—*Zverolék. Rozpravy.* **9.** 217-218.

It is possible to produce a high degree of immunity against artificial infection by the inoculation of swine with a vaccine prepared from the emulsified brains of animals in the later stage of the disease. It is very important that only healthy animals should be vaccinated, as the vaccination of swine in the incubation stage does not prevent the development of the disease. Immunity is established four weeks after inoculation. From the practical standpoint, it would be advisable to perform the inoculation in the early summer, when there is least danger of the spread of the disease.—E. Pribyl (Brno).

Truche, C., Cruveilhier, L., & Viala, C. (1935). Deux cas de maladie d'Aujeszky observés en France. [**Two Cases of Aujeszky's Disease in France**].—*Bull. Acad. vét. Fr.* **8.** 463-468. [8 refs.]

Two clinically typical cases in cattle furnish further evidence that Aujeszky's disease occurs in France. In one case the disease was passed successfully to guinea pigs and rabbits. Human beings, with abrasions contaminated with possibly infective material, developed no symptoms.—E. Weston Hurst.

Gentilucci, A. S. (1935). La *pseudo-rabbia* (paralisi bulbare infettiva). [**Aujeszky's Disease**].—*Ann. Igiene* (*sper.*) **45.** 48-53. [23 refs.]

Aujeszky's disease has been reported from Europe and North and South

America. The virus attacks all domestic animals but not man, and it may be transmitted experimentally to laboratory animals. The main points which differentiate this disease from rabies are as follows :– the incubation period is short, symptoms set in suddenly, affected animals show no aggressive tendencies, the faculties are preserved and a short period of paralysis precedes death. The most conspicuous lesions are a softening of the spinal cord and brain, but Negri bodies are absent. The virus may be recovered from the blood stream 15 hours after it has been inoculated into the brain ; it resists drying and retains its virulence for a long time in glycerin.—J. A. NICHOLSON.

PATTO, O., & CARNEIRO, J. M. (1934). Questoes de immunidade na raiva e pseudo-raiva. [**Immunity to Rabies and Aujeszky's Disease**].—*Brazil-med.* **47.** 474-480. 5 tables. [33 refs.] [English summary : abst. from orig.]

The authors attempted to break down natural and artificial immunity to rabies and Aujeszky's disease in dogs by blockading the reticulo-endothelial system with Chinese ink simultaneously with the inoculation of virus. The experiment was successful in the case of Aujeszky's disease in dogs. It was further possible to break down the natural resistance of rabbits to subcutaneous inoculation with this virus. Of six dogs immune to rabies, four succumbed to rabies virus with one injection of ink and virus and the remaining two succumbed after subsequent and more intensive blockading.—R. S. ROBERTS.

SHORTT, H. E. (1935). **Morphological Studies on Rabies. Part II. Negri Bodies in the *Hippocampus major* in Street Virus Infections.**—*Indian J. med. Res.* **23.** 407-436. 1 text fig., 58 figs. on 3 plates. [34 refs.] [For abst. of previous article, see this *Bull.* **4.** 656].

The findings of previous workers who have described the structure or discussed the nature of Negri bodies are briefly reviewed. The author is of the opinion that many of the hypotheses that have been advanced are based too much upon theory and too little on fact. In this article he shows that Negri bodies consist of a membrane, a matrix and inner bodies ; they are always intracellular and cytoplasmic in position, and exhibit growth in size, although the method is obscure. He concludes that on account of their recognizable internal structure they are more than inclusion bodies ; he is inclined to support the contention of PAUL and SCHWEINBURG that they are vegetable parasites, and considers them to be most nearly related to the yeasts.

The researches described consist only of studies of Negri bodies in the hippocampus major. The material was obtained chiefly from dogs infected experimentally with street virus by intramuscular inoculation in the neck, but some natural cases were included, in addition to experimental material from monkeys, cattle and rabbits. Mann's stain was used for diagnostic examinations, after fixing the material in Sansom's modified Carnoy's fluid but, for detailed morphology, fixing in Flemming's solution and staining with iron haematoxylin was preferred. Paraffin embedding gave satisfactory results, but the double paraffin-celloidin method proved excellent for iron haematoxylin.

In position the Negri bodies lie in the cytoplasm of the pyramidal cells or their nerve prolongations and, while originally spherical, when they increase in size their shape varies with the position of the outer boundaries, and with the inner body formation. Thus spherical, ovoid, triangular, elongate, amoeboid, budding, irregular and fractionate (produced in the action of cutting on the microtome) forms may be seen in cross section. The smallest visible are about 0·25μ in diameter, but they increase in size as the disease progresses as, although small forms

only are first seen (just prior to the onset of symptoms), later, large and small forms occur, and the largest may occupy an area in cross section of about 100 sq.μ. The small forms present in the late stages of the disease may either be due to a disruption of the larger bodies, or to a persistent production from the invisible virus. There may be ten to 12, but usually not more than four to five bodies in one nerve cell. They consist of an outer wall and an inner homogeneous matrix, in which are situated one or more inner bodies showing great diversity of shape, size and form, particulars of which are illustrated in a number of interesting figures.—N. Hole.

Levaditi, C., & Schoen, R. (1935). Les corps de Negri dans le cytoplasme des épithéliums de la cornée. [**Negri Bodies in the Cytoplasm of the Corneal Epithelium**].—*Ann. Inst. Pasteur.* Rabies suppl. pp. 69-96. 9 figs., 2 tables. [20 refs.]

When rabies virus is introduced into the eye, oxyphilic inclusions, which are regarded as the counterpart of Negri bodies, are formed within the corneal cells. [The nature of these bodies has been discussed in a previous article – see this *Bull.* **5.** 813]. The rabbit and, up to a certain point, the white mouse are the only animals which will react in this way, negative results having been obtained in the guinea pig, cat, dog and monkey.

In addition to the cornea, it can be shown that the virus has an affinity for other tissues of the ecto-endodermal system but, in these parts, the visible phase in the cycle of the virus (Negri bodies or oxyphilic inclusions) is not seen. It is suggested that the virus simply traverses these tissues to reach the nervous centres.

Experiments on the cornea have permitted a comparison between the virus of rabies and that of vaccinia. With the latter, the virus remains strictly localized to the scarified eye whereas, in rabies, the virus travels along the nerve paths and eventually reaches the opposite cornea.—R. E. Glover.

Manouélian, Y. (1935). Le mécanisme de l'infection de la salive au cours de la rage. [**Infection of the Saliva in Rabies**].—*Ann. Inst. Pasteur.* Rabies suppl. pp. 97-107. 9 figs. on 2 plates. [9 refs.]

This article is a general review of the methods whereby the saliva becomes contaminated with rabies virus. The author explains in detail the histology of the tongue, Wharton's duct and the salivary glands, and indicates that numerous small nerve ganglia are situated very near the epithelial surfaces of the tongue and duct, and the acini of the glands. Since in rabies Negri bodies are to be found only in this nervous tissue, infection of the saliva undoubtedly occurs through the liberation of infected cells by minute trauma. If precautions are taken to avoid damage to the epithelium, the saliva will remain free from virus [see also this *Bull.* **5.** 719].—R. E. Glover.

Waldhecker, M. (1935). Versuche zur Züchtung des Lyssavirus. [**The Cultivation of Rabies Virus**].—*Zlb. Bakt. I. (Orig.).* **135.** 259-262. [6 refs.]

The author failed to cultivate rabies virus either in embryonal tissue culture or in symbiosis with various bacteria.—E. J. Pullinger.

Lépine, P., Cruveilhier, L., & Sautter, V. (1935). Recherches sur la virulence des moelles rabiques en relation avec l'état actuel du virus fixe de l'Institut Pasteur. [**The Present Position regarding the Fixed Virus of the Pasteur Institute**].—*Ann. Inst. Pasteur.* Rabies suppl. pp. 127-150. 1 fig. [24 refs.]

Grysez, V., & Marneff, H. (1935). Les modifications du virus fixe de Pasteur

entretenu à Lille de 1895 à 1935. [**Modifications in the Lille Strain of Fixed Virus between 1895 and 1935**].—*Ibid.* pp. 151-156.

Remlinger, P., & Bailly, J. (1935). Influence des passages de lapin à lapin sur la sensibilité du virus fixe à divers agents d'atténuation. [**The Effect of Rabbit to Rabbit Passage on the Sensitivity of Fixed Virus to Various Attenuating Agents**].—*Ibid.* pp. 157-175. 3 tables. [16 refs.]

During the past 55 years, the original fixed virus of Pasteur has been passaged through rabbits more than 1,500 times, during which period its characteristics have been carefully determined at regular intervals. Up to 1923, the strain had shown no appreciable change either in the unmodified form or when attenuated. Recently, however, it has been observed that the untreated virus has undergone a slight diminution in its virulence, while the dried cords are more susceptible to desiccation, since the sixth day material is invariably avirulent and marked variations are noted with four and five-day cords. It has also been observed that the virus is more susceptible to the destructive action of glycerin, and usually becomes inert by the 30th day: this is particularly marked with attenuated cords. For this reason the authors are in favour of their preservation in the frozen state rather than in glycerin.

It is also pointed out that at the present time the virus is always abundant in the brain, but may be irregularly distributed in the cord. In future, the desirability of using brain emulsions for the vaccine may require consideration.

Grysez and Marneff have also noted certain alterations in the characters of the original Pasteur strain which has been maintained at Lille. These changes, which commenced about 1930, were manifested by a tendency to a shorter period of incubation. Similar irregularities were noted with the Paris strain. It has been found, however, that, if the virulent cords are stored in glycerin for a period of not less than 30 days, they then kill rabbits regularly within the classical period.

Remlinger has reported that the fixed virus maintained in Tangiers has become more sensitive to glycerin and to desiccation. This is attributed to the greater number of passage experiments through the rabbit, due to the use of an indigenous breed in which the period elapsing between inoculation and death is shorter than in European rabbits. On the other hand, this process seems to have rendered the virus less sensitive to the action of ether and to simple dilution. It follows, therefore (according to the author) that those institutes which attenuate their cords by ether or prefer the dilution method of Högyes may run the risk of commencing treatment with emulsions which are too virulent.—R. E. Glover.

—. (1935). Annales de l'Institut Pasteur supplément numéro commémoratif sur la rage. Cinquantième anniversaire de la première vaccination antirabique. [**Special Supplement to the** *Ann. Inst. Pasteur* **Commemorating the First Antirabies Vaccination in 1885**]. pp. 228. 29 text figs., 9 figs. on 2 plates, 12 tables. [Numerous refs.] Paris: Masson et Cie. [8vo] [Fr.30].

On July 6th, 1935, a meeting was held at the Pasteur Institute to commemorate the 50th anniversary of Pasteur's first antirabies treatment in a human being. This supplement contains the addresses delivered at the meeting and, in addition, 13 articles on recent research work in rabies [the latter are being abstracted separately].

Dr Martin, the Director of the Pasteur Institute, gave a brief account of Pasteur's experimental work on dogs, Dr P. Vallery-Radot gave a historical account of Pasteur's first human case, quoting from the latter's diary notes, and Drs Lepine and Cruveilhier reviewed the results of 50 years of antirabic vaccination.—J. E.

PLANTUREUX, E. (1935). Sur la vaccination antirabique des chiens avant morsure. [**Preventive Vaccination of Dogs against Rabies**].—*Ann. Inst. Pasteur.* Rabies suppl. pp. 176-180. [2 refs.]

This article is a plea for the adoption throughout France of those measures of protective vaccination of dogs against rabies which have proved successful in the French colonies. The author writes with first-hand knowledge of Algeria and gives brief details of the dead formolized vaccine prepared by him for use in that country, the scale of dosage adopted and the results obtained in its use on more than 17,000 dogs during the past six years.—C. DAVENPORT.

INDO-CHINA. (1935). **Decree of 13th April, 1935, Concerning Preventive Vaccination of Dogs against Rabies.**—*J. off. Républ. Française.* **67.** 4336. [Copied *verbatim* from *Bull. Hyg., Lond.* **10.** 687-688].

In view of the increasing number of persons who are exposed to the risks of rabies and have to follow specific treatment in the special Institutes of Indo-China during recent years, it is evident that rabies is increasing. It is decreed, therefore, that dogs which are vaccinated against rabies by the formolized antirabic vaccine prepared at the Pasteur Institute of Nhatrang shall be exempted from slaughter if they have been bitten or attacked by an animal suspected of rabies. The vaccination must have been carried out by a veterinary surgeon, and in the event of a dog being bitten or attacked, the owner must cause the dog to be re-vaccinated within seven days and, moreover, the dog must remain for four months under the surveillance of the Veterinary Service, being inspected every fifteen days. During this period, the dog must not be allowed out in the public street unless on a lead and muzzled. Failure to comply with these conditions will involve the slaughter of the dog. No modification is allowed in the existing Regulations as concerns cats and other carnivores.

ROMENSKI, N. W. (1935). Sur la composition minérale du système nerveux centrale chez les lapins, dans la rage expérimentale. [**The Mineral Content of the Central Nervous System of the Rabbit in Experimental Rabies**].—*Ann. Inst. Pasteur.* Rabies suppl. pp. 181-190. 3 tables. [11 refs.]

The author found that the production of experimental rabies in rabbits was accompanied by definite changes in the mineral composition of the central nervous system, as compared with controls. In the whole brain an increased amount of calcium and a decreased amount of sodium was found. In the medulla, the sodium was found to decrease as the calcium, magnesium and potassium increased. In general the mineral composition of the central nervous system of infected animals was more liable to fluctuation than that of controls.—G. D. SHEARER.

PLANTUREUX, E. (1935). Traitement de la maladie du jeune âge des chiens (maladie de Carré) par un sérum spécifique. [**Specific Serum Treatment of Canine Distemper**].—*Arch. Inst. Pasteur Algér.* **13.** 233-245. 7 charts. [15 refs.]

The author describes the results obtained with anti-distemper serum prepared from dogs, already naturally resistant to distemper, by enhancing the immunity with one inoculation of 20 c.c. of formolized virus. The dogs were bled to death ten or 12 days after receiving the formolized virus. The sera of 30 to 50 dogs were mixed but no attempt was made to concentrate the serum. The dose of serum was computed on the basis of 3 to 6 c.c. per kg. body weight.

If the serum was administered on or before the third or fourth day of illness, before the invasion of secondary organisms took place, very satisfactory results

were obtained. If the response was not entirely satisfactory, or if the serum was given later in the disease, it was found of benefit to give a second or even a third dose of serum.

One case is described in which chorea was treated by the combination of "urotropine" and serum; the results were inconclusive. ["Urotropine" is stated to render the vasculo-meningeal barrier more permeable to substances of a large molecular structure such as antibodies are believed to possess].—G. F. B.

Nörr, J. (1935). Ueber tollwutverdächtige Erscheinungen bei der sog. nervösen Staupe des Hundes. [**Symptoms Resembling Rabies in the So-Called Nervous Distemper of Dogs**].—*Münch. tierärztl. Wschr.* **86.** 529-531. [5 refs.]

A type of distemper is recorded, in which dogs showed symptoms closely simulating those of rabies. Striking symptoms were spasms of the masticatory muscles, profuse salivation, aggressive behaviour and characteristic posterior paralysis.—E. J. Pullinger.

Claussen, L. (1935). Zur Kenntnis der infektiösen pseudomembranösen Enteritis der Katzen. [**Infectious Enteritis of Cats**].—*Dtsch. tierärztl. Wschr.* **43.** 739-741. 1 fig. [4 refs.]

A description of the macroscopic and microscopic pathology of a few cases of enteritis of cats in Hamburg. The disease resembles, and is probably identical with, feline gastro-enteritis, which is caused by a filtrable virus, though the author did not carry out transmission experiments to verify this [see this *Bull.* **5.** 19].

—J. E.

Bisbocci, G. (1935). Contributo alla conoscenza delle lesioni istologiche e anatomiche nella gastro-enterite infettiva dei gatti. [**Histopathology of Infectious Gastro-Enteritis of Cats**].—*Nuovo Ercol.* **40.** 401-418. 8 figs. [Numerous refs.]

Examinations were carried out on 35 cats that had died from infectious gastro-enteritis. The disease appears to be more prevalent in spring and autumn and the mortality rate is highest among young animals. The characteristic symptoms are anorexia, vomition, diarrhoea, pain on palpation of the abdomen and a raised temperature. Death follows in 24 to 48 hours or, in older animals, within six days. On *post-mortem* examination extensive lesions are found. There is a catarrhal, desquamating gastro-enteritis with, sometimes, necrosis and gelatinous degeneration of the circular and longitudinal muscles of the intestine; the splenic pulp is congested with red blood corpuscles and the malpighian follicles show signs of proliferation and contain a large number of mature lymphocytes; there is necrosis and degeneration of the liver and gelatinous degeneration of the heart muscle; the meninges are congested and may show petechial haemorrhages; broncho-pneumonia and nephritis may also be present. The mesenteric and gastric lymph glands are enlarged and there is an epitheloid proliferation of the reticulo-endothelial system throughout the body. These changes are probably caused by secondary invaders and a coliform organism was isolated in every case.

—J. A. Nicholson.

I. Dalling, T. (1934). **Distemper of the Cat.**—*Vet. Rec.* **14.** 1137-1148. 1 table, 4 charts. [8 refs.]

II. Dalling, T. (1935). **Distemper of the Cat.**—*Ibid.* **15.** 283-289. [5 refs.]

I. The author confirmed the presence of a filtrable virus as described by

Hindle and Findlay [(1932). *J. comp. Path.* **45.** 11.] in the specific feline enteritis, referred to as cat distemper.

Filtered material injected into susceptible kittens produced the clinical signs of the disease, but these were not present in a very acute form. If to the filtered material there is added an emulsion of a haemolytic streptococcus, recovered from naturally occurring cases, then the disease assumes the acute form seen in the field. Death results in about 48 hours and on *post-mortem* examination the lesions typical of the natural disease are found.

The work established the clinical observation that cats are susceptible to more than one type of infectious disease grouped under the name of " distemper ". The two types described are " feline enteritis " and another form varying from nasal catarrh to broncho-pneumonia ; these appear to be two distinct clinical entities. The results of experimental work suggest that an active immunity can be produced against infectious enteritis.

II. A later paper by the same author giving more details of the work of immunization of cats against feline enteritis.—G. F. Boddie.

Zuwerkalow, & Babitsch, M. (1935). Physikalische und biochemische Untersuchungen des Blutes bei Schweinepest. [**Physical and Biochemical Investigation of the Blood in Swine Fever**].—*Arch. wiss. prakt. Tierheilk.* **69.** 264-274. 2 figs. [10 refs.]

Changes in the physico-chemical characteristics of the blood of pigs infected with swine fever are noted. In normal pigs these characteristics remain remarkably constant. In infected pigs there is a striking fall in the protein content of the blood serum immediately following infection ; both the amino-nitrogen and the residual nitrogen contents fall ; the electrical conductivity of the blood decreases during the first week of infection and then rises slowly towards the normal level. The viscosity of the blood increases markedly. [Adequate tests are not reported to show whether or not similar changes occur during other febrile conditions]. —E. J. Pullinger.

—. (1935). **The Pathological Diagnosis of Swine Fever.**—*Vet. Rec.* **15.** 1256-1257. [6 refs.]

Rapid and accurate diagnosis is of paramount importance if success is to be obtained in the reduction of swine fever in Great Britain. In this respect the research work of Seifried and of Röhrer deserves careful consideration. They both find the disease to be primarily one of the vascular system, the typical haemorrhages, infarcts and necroses all originating with changes in the smaller vessels and capillaries. Seifried considers that degenerative changes are more characteristic of acute disease, and proliferative changes of the chronic conditions. Encephalitis, with perivascular cell infiltration, degenerative lesions in the nerve cells and glial proliferation, also occurs in about half the cases. The possible diagnostic value of histological lesions should be considered.—Norman Hole.

Lwoff, N. S. (1935). Die Pockenkrankheit der Schweine. [**Swine Pox**].—*Berl. tierärztl. Wschr.* **51.** 499-501. 4 figs., 2 tables. [5 refs.]

This article is divided into three parts :– (1) a summary of the published works on the subject ; (2) field observations carried out in the breeding piggeries in the province of Moscow on a disease which was a typical pox but not considered to be true swine pox, and (3) experimental work.

As regards (2) Lwoff found that the disease dealt with was not confined to adult swine but that pigs of all ages were susceptible. He gives a description of

the disease and classifies it into four forms which he calls (a) the localized form : this is the common form and is characterized by the full development of the pustules : he considers that the mode of infection is through trauma of the skin ; (b) the abortive or benign form : this occurs among pigs affected with the localized form and is characterized by small pustules which heal rapidly ; (c) the mixed form : this is a combination of (a) and (b), and (d) a form with button-shaped haemorrhagic papules ; the lesions are usually localized to the thicker areas of skin but occasionally, in sucking pigs, are found covering the whole body. This form is fatal.

As regards (3) Lwoff found in his experiments that the virus of this outbreak differed immunologically from the pox viruses of the other domestic animals and man. He found that he could produce the disease by artificial inoculation in pigs only. Rabbits, guinea pigs, white mice, sheep and calves were immune.—G. D. M.

Greene, H. S. N. (1935). **Rabbit Pox. IV. Susceptibility as a Function of Constitutional Factors.**—*J. exp. Med.* **62.** 305-329. 2 figs., 5 tables. [9 refs.] [For abst. of previous article of this series, see this *Bull.* **6.** 134].

The clinical manifestations and pathology of the disease have already been reported [this *Bull.* **5.** 77]. During an extensive epidemic, the mortality rate amongst young animals was 71 per cent. and amongst adults only 14 per cent. The highest mortality occurred in young rabbits between four and nine weeks of age when they were being weaned and were consequently in a low state of health. Lactating does were highly susceptible for the same reason but, apart from the question of the strain imposed by reproduction, sex had no other influence upon susceptibility. Two groups of hereditary factors played a part in susceptibility ; one group consisted of essential racial factors, the other of constitutional factors having only a chance relationship to the racial susceptibility.—E. J. Pullinger.

Rosahn, P. D., & Hu, C. K. (1935). **Rabbit Pox. Report of an Epidemic.**—*J. exp. Med.* **62.** 331-347. 2 figs. on 1 plate, 2 tables. [8 refs.]

A third epidemic of rabbit pox has occurred at the Rockefeller Institute, characterized by a macular and, later, by a papular eruption of the skin and mucous membranes, high temperature, prostration, blepharitis, enlargement and induration of lymph nodes and, quite frequently, orchitis. In addition, necropsy typically revealed indurated nodules in the superficial parts of the lungs, sometimes also in the liver and spleen. Microscopically, these lesions consisted of a central area of necrosis surrounded by small round cells, oedema and haemorrhage. The incubation period was about 11 days, the disease being very infectious with a high mortality. The aetiological agent was found to be related to those causing previous outbreaks ; immunity lasted at least nine to 12 months, and young animals sucking an immune doe were found to be more resistant than those sucking a non-immune animal.—Norman Hole.

Bierbaum, K., & Gaede, H. (1935). Die Züchtung von Geflügelpockenvirus in der Gewebekultur. [**The Growth of Fowl Pox Virus in Tissue Culture**].—*Arch. wiss. prakt. Tierheilk.* **69.** 441-445. [3 refs.]

Samples of pigeon pox virus passed intracerebrally through pigeons at about ten-day intervals were bacteriologically sterile at the third passage ; virus was localized to the site of the inoculation. Fowl pox virus was passed similarly (two passages) in fowl brain. Attempted transmission of pigeon pox virus to mice failed.

Using two usual techniques, the pigeon pox virus was carried in tissue cultures through six and 12 subcultures ; the exact amount of multiplication was not determined.—E. Weston Hurst.

Leynen, E. (1935). La peste aviaire. [**Fowl Plague**].—*12th Int. vet. Congr. 1934.* **3.** 132-144. [Numerous refs.] [English, German and Spanish summaries : abst. from orig. in French].

A comprehensive paper in which the behaviour and cultivation of the virus and the incidence, symptoms and lesions of the disease are discussed. Regarding the relationship between fowl plague and Newcastle disease, Picard's disease and Egyptian fowl plague, the author states that the symptoms and lesions are very similar. He considers it probable that they are different forms of the same disease, due to modification in the behaviour of the virus.—Gwilym O. Davies.

Laurita, R. (1935). Azione patogena del virus della peste aviare nell'oca e nell'anitra. [**Susceptibility of Geese and Ducks to Fowl Plague**].—*Profilassi.* **8.** 50-51. [13 refs.] [English and French summaries : abst. from orig.]

In order to determine whether it is possible to infect geese with fowl plague, blood from an infected hen was inoculated intravenously into two of these birds. Twenty-four hours later, five-drop amounts of blood from the geese were injected into susceptible hens. These died in 48 hours and showed typical lesions of fowl plague. The geese died 144 hours after they had received the injection and it was possible to recover virulent material from their spleens. The experiments were repeated on ducks. These birds proved to be more resistant to the virus than geese, but their blood was infective for susceptible hens. When they were killed ten days after inoculation, virulent material could not be obtained from the brain, bone-marrow or spleen. The author concludes that it is improbable that the virus becomes localized in the brain since, throughout the course of the disease, the blood of the inoculated birds remained virulent for hens.—J. A. Nicholson.

Rachad, A. M. (1934). **Fowl Plague in Egypt.**—*Bull. Minist. Agric. Egypt.* No. 140. pp. 22. 1 table. [44 refs.]

This is a survey of existing knowledge of fowl plague, with details of some experimental work carried out by the author.—T. M. Doyle.

Troisier, J., & Sifferlen, J. (1935). Leucose et sarcomatose des poules ; unité de virus. [**The Unity of the Viruses of Fowl Sarcoma and Fowl Leucosis**].—*Ann. Inst. Pasteur.* **55.** 501-517. 6 figs. [11 refs.]

The authors observed that :- (1) the liver of a leucaemic fowl, inoculated intramuscularly, gave rise to a local osteo-chondro-sarcoma 1 cm. from the point of injection, associated with leuco-erythroblastosis of the blood. (2) Intramuscular inoculation of a spindle-celled sarcoma led to death from leucaemia. (3) Intravenous inoculation of blood from a leucaemic fowl produced generalized sarcomatosis, transmissible as such for three passages ; one of the birds at the third passage had associated leucaemic lesions of the viscera with erythroblastosis of the blood. This virus was filtrable. Attempted transmission to six pigeons and two ducks failed. (4) Intramuscular inoculation of leucaemic liver and spleen caused, at the exact site of injection, a metastasizing, spindle-celled sarcoma, transmissible as such for three generations. These results, and similar observations by other workers, suggest that if the viruses of leucosis and sarcoma are not one and the same, their tropisms are not wholly fixed and can be modified by experimental conditions. The authors apparently favour the theory of virus unity.—E. W. H.

MEYER, A. R., ENGELBRETH-HOLM, J., & UHL, E. (1935). **Further Studies on the Agent of Chicken Leukosis.**—*Acta path. microbiol. scand.* **12.** 378-392. 12 tables. [17 refs.] [In English].

The authors show that the agent of chicken leucosis can be bound by blood corpuscles from normal and recovered chickens as well as those from pigeons, rabbits, sheep and man. The process, therefore, is probably one of adsorption. Natural immunity was never found in chicks less than two months of age, but was not uncommon in adult birds. Recovery from leucosis sometimes occurs. Such an active immunity against one strain of leucosis is shown to protect against other strains as well as the authors' combined strain of leucosis-sarcoma, but the immunity is not always lasting. The serum of recovered fowls may inhibit or neutralize infective leucotic serum, but has no influence on the cell-bound agent.

Normal duck serum possesses no inhibition against the agent of chicken leucosis, but the serum of ducks immunized by repeated intramuscular injection of leucotic material has this property. Such immune serum also appears active against leucotic whole blood.—C. V. WATKINS.

ENGELBRETH-HOLM, J., & MEYER, A. R. (1935). **Variations in the Percentage of Takes in 3 Strains of Chicken Leukosis.**—*Acta path. microbiol. scand.* **12.** 366-377. 2 tables, 4 graphs. [6 refs.] [In English].

The authors show, by tables and graphs, differences in " takes " when transmitting various strains of erythroblastosis and myelosis in three-month-old chicks. The average figure for the former was 97 per cent. and for the latter 35 per cent., with a duration of illness of 12 and 32·5 days respectively. The duration of erythroblastosis disease was an inverse of the percentage " take " of the strain used, while for myeloblastosis the curves were similar.

In all their experiments chicks less than three months old were more susceptible than birds over six months of age. This may be due to a seasonal variation in " takes " found in adult birds, and this in turn may be due to variations in hormonal activity, especially of the growth hormone. The average " take " of erythroblastosis in adult birds was 70 per cent. with a maximum from April to May (82 per cent.) and a minimum from October to November (40 per cent.).—C. V. W.

—. (1935). **Psittacosis.**—*Med. J. Aust.* Aug. 17th. 219. [1 ref.]

This is a commentary on recent investigations on psittacosis. A puzzling aspect of the disease is that Australian parrots have been proved to be infected and have given rise to outbreaks in human beings in the British Isles when exported, but that human infection is practically unknown in Australia.—W. I. B. BEVERIDGE.

LILLIE, R. D. (1935). **Histologic Reaction to the Virus of Rocky Mountain Spotted Fever in Chick Embryos.**—*Publ. Hlth Rep., Wash.* **50.** 1498-1501.

Chick embryos of 12 to 19 days' incubation were fixed whole in Orth's fluid two to six days after inoculation with embryo virus. Fourth passage virus gave rise to no marked changes, but ninth or later passage material caused definite lesions. The principal changes comprised vascular adventitial proliferation, endovascular lesions and lymphocytic infiltration in the foetal membranes, and a perivascular or interstitial infiltration by lymphocytes in serous, glandular and muscular organs of the embryo.—NORMAN HOLE.

BENGSTON, Ida A., & DYER, R. E. (1935). **Cultivation of the Virus of Rocky Mountain Spotted Fever in the Developing Chick Embryo.**—*Publ. Hlth Rep., Wash.* **50.** 1489-1498. 3 figs. on 3 plates. [19 refs.]

The chick embryo method, adopting the technique of GOODPASTURE, which had been successfully used for several virus diseases, was preferred to the tissue culture method. First generation culture of rickettsia in chick embryo was previously studied by DA CUNHA, and ZIA had reported the cultivation of the rickettsia of Mexican typhus fever through the third generation.

Details are given of the cover-slip method of making inoculations of the membrane, which was found to be the most satisfactory. Embryos ten to 12 days old were used for the inoculations. Beginning with the 18th generation, some of the embryos were incubated at 33°C. The strain used had previously been employed extensively for experimental work, and provoked typical reactions. It is maintained by intraperitoneal inoculation of heart-blood taken from an infected guinea pig on the second day of fever. The reactions obtained subsequent to inoculation are described.

The inoculum used in cultivation was a diluted suspension of spleen pulp from an infected guinea pig. The passages were carried out with preparations of the membrane which had been exposed to infection. Tests were carried out to confirm freedom from bacterial contamination and to determine if the virus was still alive. The cultivation of the virus was comparatively easy and was continued through 20 passages. The deaths of embryos which occurred on the fifth or sixth days were considered to be due to infection with Rocky Mountain spotted fever. There was some indication that the virulence increased with passage.

The distribution of the virus was not confined to the membrane, but included certain of the organs. A description is given of the development of the membrane lesion as seen microscopically. The presence of rickettsiae was only definitely ascertained after the virus had been passaged through several generations. They were demonstrated in specially prepared impression smears of the infected membrane. Typical rickettsiae were demonstrated in membranes of all the generations succeeding the tenth. They were not seen in any part of the embryo except the membrane. Giemsa's stain was used throughout.

The results of the numerous guinea pig inoculations made are given. The virus was apparently more virulent for the embryos than for the guinea pigs.
—F. H. MANLEY.

WOLLMAN, E. (1935). **The Phenomenon of Twort-d'Hérelle and its Significance.** —*Lancet.* **229.** 1312-1314. [10 refs.]

The author reviews the evidence for and against either the parasitic theory or the diastatic theory being adequate in elucidating the Twort-d'Hérelle phenomenon and comes to the conclusion that both these theories fail to satisfy the requirements.

He advances the theory that the phenomenon is due to the action of lysogenic genes present in the " germ plasm " of the bacteria themselves. These genes, being hereditarily transmissible, ensure the continuance of the phenomenon through successive generations. He also postulates that, in these processes, extracellular factors are present which can convert a previously normal cell into a lysogenic one (" hereditary contagious autolysis ").—A. BROWNLEE.

ARTHROPODS IN RELATION TO DISEASE.

PARISH, H. E., & LAAKE, E. W. (1935). **Species of Calliphoridae concerned in the Production of Myiasis in Domestic Animals, Menard County, Texas.** —*J. Parasit.* **21.** 264-266. 1 table. [1 ref.]

The authors discuss the seasonal variation in blowfly infestation of domesti-

cated animals in Texas. For instance, during April and May *Phormia regina*, which is a cold weather species of blowfly, constituted over 67 per cent. of all adults reared from larvae developed in the wounds. *Cochliomyia* spp. composed over 99 per cent. of all adults reared from larvae obtained from wounds during the summer and autumn months. *Sarcophaga plinthopyga* was only found in very limited numbers.—J. S. Steward.

Lewis, E. A. (1934). **A Study of the Ticks in Kenya Colony. The Influence of Natural Conditions and Other Factors on their Distribution and the Incidence of Tick-Borne Diseases. Part III. Investigations into the Tick Problem in the Masai Reserve.**—*Bull. Div. anim. Indust., Kenya.* No. 7. pp. 67. 2 figs., 7 tables, 3 maps. [44 refs.] [For abst. of previous articles of this series, see this *Bull.* **4.** 241].

This is the third of a series of reports on the tick fauna of Kenya Colony and relates to the large pastoral area of the Masai Reserve. The first 35 pages are devoted to a general discussion of topographical features of the area, its climate, soils, stock and game, and to historical references to ticks and disease. The actual records of ticks collected occupy 11 pages, and the bulletin concludes with ten pages of general discussion on the subject of ticks and tick-borne diseases in the Reserve.

In the course of his survey of the area, the author has collected 30 species of ticks – 11 species of *Rhipicephalus*, 7 species of *Amblyomma*, 3 each of *Haemaphysalis* and *Hyalomma*, 2 each of *Ixodes* and *Dermacentor* and 1 each of *Boophilus* and *Aponomma*. Of the 30 species, six are known to act as vectors of diseases of domesticated animals. *Amblyomma variegatum*, the common vector of heartwater and also a vector of Nairobi sheep disease, and *R. evertsi*, are said to be the commonest species in the Reserve. The taking of larvae and nymphs of the former species from guinea fowl and spur fowl is of interest.

The distribution of *R. appendiculatus*, the chief vector of East Coast fever, is uneven but, although in general it appears to be closely associated with the chocolate forest loam soils, it has spread into adjoining areas of black cotton soil, and the author is of the opinion that this species is still extending its range into an atypical environment. It is concluded that measures for the control of *R. appendiculatus* and East Coast fever should be applied to the Masai Reserve at once, before any invasion of further areas can take place. It is significant that, during the survey of the area, *R. appendiculatus* was not collected from any of the numerous species of game in the Reserve but only from cattle and sheep.—R. D.

Lawrence, H. (1935). **The Pathogenicity of Dermanyssus avium et gallinae and of Trichomes in the Human Being.**—*Med. J. Aust.* July 6th. 16-20. 6 figs.

The veterinary interest concerns pruritus in human beings due to the bird mite, *D. avium*. In one case the source was found to be a bath sponge to which mites from an adjacent starling's nest had gained access.—H. McL. Gordon.

Krijgsman, B. J. (1934). **Veterinary Entomology in the Netherlands Indies.**—*Proc. 5th Pacif. Sci. Congr. Can. 1933.* **5.** 3357-3360. [Numerous refs.]

The present paper reviews the research work on veterinary entomology which has been carried out in the Dutch East Indies. Surra has been experimentally transmitted in the laboratory by *Tabanus*, *Chrysops*, *Haematopoton*, *Stomoxys* (and possibly *Lyperosia*) and the mosquitoes *Anopheles* and *Armigeres*. Transmission by these flies was purely mechanical. The control of *Hippobosca* spp. on horses

has been effected by regular treatment with a dip containing petroleum. The non-pathogenic *Tryp. theileri* has been shown to be transmitted by the bite of *Tabanus striatus* or by animals eating the flies or their excreta. It is believed that, under certain conditions, the organisms of bacillary osteomyelitis in buffaloes [see this *Bull.* **5.** 120.], blackleg and anthrax may be carried by species of the genera *Tabanus*, *Chrysops*, *Stomoxys*, *Musca*, *Lyperosia*, *Anopheles*, *Armigeres* and *Stegomyia*. —J. S. Steward.

Backlund, H. O. (1935). **A Contribution to the Knowledge of the Poultry-Lice in Finland.**—*Memor. Soc. Fauna Flor. fenn.* **10.** 42-46. 1 table. [12 refs.] [In English].

Backlund records the result of a survey of the species of poultry lice occurring in Finland.

Four species only were found on chickens :– *Menopon pallidum* and *Goniocotes hologaster* were met with most frequently ; *M. biseriatum* to a less extent, and *Goniodes dissimilis* was found on one farm only.

All the turkeys examined were found to be infested with *Goniodes meleagridis* and *M. biseriatum*. Turkeys were usually more heavily infested than chickens. —J. S. Steward.

DISEASES CAUSED BY HELMINTH PARASITES.

Galli-Valerio, B. (1935). Observations helminthologiques. [**Notes on Helminths**].—*Schweiz. Arch. Tierheilk.* **77.** 420-428. [Numerous refs.] [In French].

Ascaris lumbricoides eats blood but this habit is variable, as is also the toxicity of the worm. The question whether this haematophagous habit may determine eye troubles similar to those occurring in ancylostomiasis and other helminth infections is discussed. The pathogenicity of helminths is not always in proportion to their numbers, but to their toxicity, so that treatment should be given at once, even if only a few eggs are found in the faeces.

Discussing the life-cycle of *Dicrocoelium lanceolatum*, the author concludes that terrestrial and not aquatic molluscs harbour its cercaria. *Cercaria longocaudata*, found by the author and others in the various terrestrial molluscs mentioned (chiefly *Helix carthusiana*, *Zebrina detrita* and *Helicella candidula* and *H. itala*), may be the cercaria of *D. lanceolatum*. It is unnecessary to postulate, with Nöller and Vogel, that a second intermediate host may exist, but there may be a metacercaria. The author hopes to continue his investigations of this life-cycle.

Referring to the importance of Anoplocephalinae in Switzerland, the author discusses their life-cycle and, after reviewing the possibilities and describing his own experiments and those of Wetzel and Stunkard, concludes that an intermediate host probably exists and is most likely to be a dung-eating beetle, perhaps of the genus *Aphodius*.—G. Lapage.

Houdemer, E. (1935). Le problème de l'anémie vermineuse des équidés. [**Anaemia Caused by Helminth Parasites in the Horse**].—*Rev. vét. milit.* **19.** 409-441. 3 tables. [4 refs.]

This is a study of trichonemiasis of horses. All other forms of strongyloid infection are specifically excluded. The paper, which is rather long, opens with definitions, a historical review and notes on the geographic distribution of the

condition in France. Some military statistics are quoted, but these do not differentiate the particular form of helminthiasis under consideration. Short sections follow devoted to symptoms, lesions, prognosis and treatment, with a longer one on diagnosis. Indications are given by which ova of trichonema may be differentiated from those of strongyles. This part of the paper contains no new material and consists largely of quotations from, or references to, the work of numerous authorities.

The remainder of the paper, rather more than half, is devoted to an enquiry into the true nature of the condition, namely, whether the symptoms shown arise as a result of heavy infestation by trichonema, or whether helminth infestation follows derangement of the constitution due to other causes. The author has been much impressed by the numerous recoveries shown in heavily infected horses through turning them out to grass, and suggests that a vitamin deficiency or some form of mineral imbalance of diet may be the true cause of this anaemia. He considers also that the sudden changes in conditions of life and feeding suffered by young horses when they pass into the army may bring about debility, with heavy infestation by trichonema as its sequel.—C. DAVENPORT.

ISSAJEV, L. (1934). **A Simple Method for the Detection of Nematode Larvae in Crustaceans.**—*Med. Parasitol., Moscow.* **3.** 238-240. [In Russian : German summary]. [Copied *verbatim* from *Trop. Dis. Bull.* **32.** 653. Signed C. A. HOARE].

Working on the transmission of guinea-worm larvae by cyclops, the author devised the following method for the rapid examination of large masses of these crustaceans. Captured cyclops are placed in test-tubes from which most of the water is pipetted off and which are kept at 35-36°C. for 1-2 days, after which the contents are examined under a microscope at a magnification from 25 to 75. By this time the majority of the crustaceans are macerated and broken up, while the Dracunculus larvae retain their normal structure and can easily be detected. This method is based on the fact that under natural conditions the larvae escape into the outer world only after the death and decomposition of their vector. It is suggested that it might be applied for the examination of crustacean vectors in the case of the larvae of other nematodes and cestodes.

LI, H. C. (1933). **Parasitic Nematodes : Studies on their Intestinal Contents. I. The Feeding of Dog Ascaris, Toxocara canis (Werner, 1782). II. The Presence of Bacteria.**—*Lingnan Sci. J.* **12.** Suppl. pp. 33-41. 1 plate. [11 refs.]

Six dogs received experimental feeds of Chinese ink twice daily over varying periods. At subsequent *post-mortem* examinations the intestinal parasitic worms were collected and examined for the presence of particles of carbon in their intestines. Five of the six dogs proved to be infested with *T. canis*, only one worm being recovered in each instance ; four of these gave negative results but the intestine of the fifth (the only female worm recovered) was found to contain carbon particles and muscle fibres of beef, showing that these worms actually do feed on intestinal contents.

A bacteriological examination was made of the intestinal contents of seven species of nematodes from various hosts and it was found that 24 of the 49 specimens which were examined contained bacteria, mostly *Bact. coli*.—E. L. TAYLOR.

I. TAYLOR, E. L. (1935). **Differential Enumeration of the Species of Nematodes Associated with Parasitic Gastritis in Sheep and Cattle.**—*Vet. Rec.* **15.** 1511-1514. 20 figs., 1 table.

II. —. (1935). **Parasitic Affections of Sheep and Cattle.**—*Ibid.* 1518-1519.

I. This note, which is a sequel to a previous one [see this *Bull.* **4.** 742.], describes a method of making a rough estimate of the numbers of the various species of trichostrongylid nematodes in the fourth stomach and small intestine of the host animal, and is intended to be of assistance when a full investigation into the nature of an outbreak of parasitic gastritis is required. A key is given to aid in the identification of the worms, with drawings (to scale) illustrating the various parts.

II. This editorial note mentions some of the recent advances in parasitology and upholds the wisdom of the new regulations for the Royal College of Veterinary Surgeons examinations which have been designed to foster the knowledge on this subject.

Heidegger, E. (1935). Das Zentralnervensystem bei parasitären Leberer-krankungen. [**The Central Nervous System in Parasitic Diseases of the Liver**].— *Arch. wiss. prakt. Tierheilk.* **69.** 329-357. 10 figs., 2 tables. [31 refs.]

It has been established that a connexion exists between changes in the brain and disease of certain organs. For example, in cirrhosis of the liver in horses, a diffuse degeneration of ganglion cells and an increase of glia cells with small nuclei may be seen in the cortex and caudate nucleus of the brain.

In a further study of the connexion between the liver and the brain, the author has examined material from horses, cattle, sheep and swine suffering from distomatosis or echinococcus infestation. The majority of cases were from cattle affected with chronic distomatosis and only two cases showed acute hepatitis. Histological examination of the central nervous system revealed reactive and progressive changes in the macroglia with regressive changes in the neuroglia, especially in the cortex of the cerebrum and caudate nucleus. The most striking change was the appearance of glia cells containing large light-coloured nuclei. In these, the chromatin had collected at the sides, leaving large vacuoles in the centre of the nucleus. In the two acute cases, glial proliferation was only seen in the caudate nucleus. These changes appeared to be permanent and did not affect the nervous parenchyma.

The author concludes that the non-inflammatory changes in the brain are the result of an intoxication. In addition to the toxic products which arise from the invading parasites, it is known that degenerating liver cells themselves give rise to toxic breakdown products. Moreover, since there is a wide-spread destruction of liver tissue, the detoxicating function of the liver is impaired or lost. These toxic substances circulating in the blood stream are sufficient to account for the changes in the brain, but whether or not they have a specific action on nervous tissue is still uncertain.—J. A. Nicholson.

Macy, R. W. (1934). **Studies on the Taxonomy, Morphology, and Biology of Prosthogonimus Macrorchis Macy, a Common Oviduct Fluke of Domestic Fowls in North America.**—*Tech. Bull. Minn. agric. Exp. Sta.* No. 98. pp. 71. 2 figs., 11 plates, 8 tables. [Numerous refs.]

The history of this species, its taxonomic position and a key for the identification of the 16 known species of the genus are given. The morphology and histology of the sporocyst, cercaria, metacercaria and adult are described. The normal habitat of the fluke is the bursa fabricii rather than the oviduct, and early atrophy of the bursa restricts infection. Ducks are believed to be the normal hosts, but hens are abnormal hosts and the fluke can cause serious losses by reducing egg-laying capacity. English sparrows and crows are probably natural reservoirs.

The sporocyst is in the snail *Amnicola limata porosa* and produces a cercaria direct, no redia having been found. The cercaria is passively drawn into the rectum of a dragonfly nymph by its breathing movements and the metacercaria is in the muscles of the nymphs, especially those of the posterior end of the abdomen. It grows there and finally encysts, the cysts lying in the body cavity. The nymphs of several genera of dragonflies harbour these metacercarial cysts. Birds become infected by eating the nymphs. The young fluke is liberated in the bird's digestive tract, passes to the cloaca and so to the bursa fabricii or oviduct. Screening lakes that harbour the nymphs to keep poultry away from the water helps to prevent infection. Carbon tetrachloride in doses of 1·5 to 1·7 c.c. in liquid cereal has been reported as successful treatment.

The biology of the snail and dragonfly intermediate hosts are discussed. —G. Lapage.

Africa, C. M., & Garcia, E. Y. (1935). **Two More Heterophyid Trematodes from the Philippines.**—*Philipp. J. Sci.* **57.** 443-448. 2 figs., 1 plate. [6 refs.]

Two new species of trematode from the small intestine of the dog are here described, the first, *Monorchotrema calderoni*, from 137 specimens collected on four occasions. This minute parasite is only 0·47 to 0·48 mm. long and 0·25 to 0·26 mm. broad ; it is most closely related to *M. microrchia* but differs in being distinctly pear-shaped, in the genital sac being immediately behind the bifurcation of the oesophagus and in having a very long, cucumber-shaped seminal vesicle. The second species is referable to the genus *Apophallus* and is named *A. eccentricus*. It is closely related to *A. muhlingi* and *A. crami* but differs in that the pharynx is longer than the oesophagus, in the relatively small size of the eggs and in other ways.—E. L. Taylor.

Garcia, G. (1935). Un caso di distomatosi epatica da " Distomum magnum " (Bassi 1875) nel bovino. [*D. magnum* **in a Bovine**].—*Nuovo Ercol.* **40.** 126-132. [17 refs.]

The author reports a case in Europe of infestation of the liver of a bovine with *D. magnum*. He refers to reports of its occurrence in other animals and gives a description of two specimens taken from the carcass of a cow. One was 78 mm. long, 36 mm. wide and 4 mm. thick ; the other was 65 mm. long, 34 mm. wide and 3 mm. thick.

Rao, M. A. N. (1935). **Further Observations on Bovine Nasal Schistosomiasis.** —*Indian J. vet. Sci.* **5.** 266-273. 5 figs. on 2 plates, 1 chart. [8 refs.]

Rao has compared numerous measurements of the eggs of *Schistosoma spindalis* and *S. nasalis* and found the average sizes to be sufficiently different to indicate quite clearly that the two species are distinct. Infection was successfully produced in a calf by *Cercariae indicae* XXX Sewell, 1922, *via* the nasal route, so confirming the author's previous observations that this is the cercaria of *S. nasalis*. Attempts to infect a buffalo and cattle with *S. nasalis* sometimes failed to produce lesions : some of Rao's experimental animals were known to be infected with *S. spindalis*, and it is thought that a group immunity may be responsible for this absence of pathological effect.

A new growth at the base of a bullock's horn was found to contain eggs of *S. nasalis* and the question of this parasite's possible connexion with the cause of such growths is raised. Attempts to find infection in sheep in endemic areas failed, and it is thought that these animals cannot be susceptible.—E. L. Taylor.

Sievers, O. (1935). Serologische Untersuchungen über Bandwurmantigene und ihre Antikörper. **[Serological Investigations of Tapeworm Antigens and Antibodies].**—*Z. ImmunForsch.* **84.** 208-224. 8 tables. [15 refs.] [Copied *verbatim* from *Trop. Dis. Bull.* **32.** 633. Signed D. B. Blacklock].

The paper gives an account of experiments with antisera developed in rabbits by the injection of tapeworm antigen.

Alcoholic extracts of dried powdered substance of *Taenia saginata*, echinococcus and *Dibothriocephalus latus* were utilized, and also material which had been preserved in alcohol and then ground ; various methods of preparing the injection material are described, one of which involves the use of pig serum as a vehicle. The antisera obtained were examined by the complement fixation and flocculation methods ; the antigens were diluted by either a fractional or a rapid method but the dilution procedure caused no appreciable difference in results.

By quantitative experiments the author found evidence that a species-specific fraction is present in tapeworm substance.

Tests on patients harbouring *Dibothriocephalus latus* did not yield satisfactory evidence of the presence in their serum of tapeworm antibodies or antigen, but further experiments are contemplated.

Meggitt, F. J. (1934). **The Theory of Host Specificity as applied to Cestodes.** —*Ann. trop. Med. Parasit.* **28.** 99-105. 3 tables. [38 refs.]

In a recent paper Fuhrmann (1932) has given expression to the view that the host species should be taken into account in determining the specificity of its cestode parasites. Meggitt here offers his criticisms and gives examples showing that there is no natural limitation of species of cestode to single groups of hosts. He further shows the confusion which would result where expert opinion differs as to the proper grouping of the hosts and expresses in a very clear way the several arguments in favour of adhering to the morphology of the parasite as the only guide to classification.—E. L. Taylor.

Garcia, E. Y., & Africa, C. M. (1935). **Diphyllobothrium latum (Linnaeus, 1758) Lühe, 1910, in a Native Filipino.**—*Philipp. J. Sci.* **57.** 451-456. 3 figs. on 1 plate. [11 refs.]

D. latum has recently appeared for the first time in the Philippines, the source of infection having been traced to the shores of a lake where fresh water fish had recently been introduced from China. It is thought that the infection was brought into the country by this means, and the authors predict that more cases of infestation will be found in man and in cats and dogs.—E. L. Taylor.

Gill, D. A. (1935). **Hydatids.**—*N. Z. J. Agric.* **51.** 350-354.

A general paper on hydatids given as a lecture to the Sanitary Inspectors' Association. The statement is made that, in New Zealand, there is echinococcus infection in about 43 per cent. of cattle and in 46 per cent. of sheep.—C. S. M. H.

Barnett, L. (1935). **A Department for Hydatid Disease Research and Prevention.** —*N. Z. med. J.* **34.** 258-260.

A nucleus of a department dealing with hydatid disease research has been created at the Medical School, Otago, by an interested board of medical men, who will have the co-operation of the Department of Agriculture where required. The author draws attention to the great prevalence of hydatids in New Zealand stock, claiming that ten million livers are affected in the sheep of the country, whilst the annual occurrence of hydatids in human beings in New Zealand is well

over 100 cases. Recently, a poster and folders were prepared by this new Department for educational purposes.—C. S. M. Hopkirk.

Lemaire, & Ribère. (1935). Sur la composition chimique du liquide hydatique. [**Chemical Composition of Hydatid Fluid**].—*C. R. Soc. Biol. Paris.* **118.** 1578-1579. [Copied *verbatim* from *Trop. Dis. Bull.* **32.** 632. Signed C. L.]

The chemical composition of hydatid fluid has been re-examined.

The mean figures are: S.G. 1,011·8; residue dried at 100°C. 13·72, ash 8·07, organic matter 5·65, chlorides (as NaCl) 5·96, urea 0·38, calcium 0·088, per litre in each case. Of cholesterol there was no trace in 27 per cent. of fluids, creatinin was constantly present with average of 9·5 mgm. per cent., inosite was present in 81 per cent. of fluids. A proteolytic ferment was always present thus explaining the absence of protein, when it is absent, and the inverse relationship here reported between albumin and amino acids; it acts best at a pH of 6·7, one which has been found present in hydatid fluid. There is also a glycolytic ferment. That is to say, creatinin, ammoniacal salts and lecithin are normally present in hydatid fluid and the existence of the ferments explains the different quantities of protein and sugar which have been reported.

Martin, Arnaud, & Velu, H. (1935). Epidémiologie de la " maladie hydatique " au Maroc. L'échinococcose humaine. L'échinococcose du bétail. [**Epidemiology of Hydatid Disease of Man and Animals in Morocco**].—*Ve Congr. Ann. Fed. Sci. méd. Algérie, Tunisie & Maroc.* April, 1935. pp. 24. 3 tables, 1 map. [6 refs.] Algiers: Imp. F. Fontana. [8vo].

Martin, & Arnaud. (1935). Epidémiologie de la " maladie hydatique " au Maroc. Première partie. L'échinococcose humaine. [**Epidemiology of Hydatid Disease of Man in Morocco**].—*Maroc méd.* Aug. 15th. 307-311. 1 table. [3 refs.]

Velu, H., & Sarthou. (1935). Epidémiologie de la " maladie hydatique " au Maroc. Deuxième partie. L'échinococcose du bétail au Maroc. [**Epidemiology of Hydatid Disease of Animals in Morocco**].—*Ibid.* 312-318. 2 tables. [3 refs.]

The authors have made a study of human hospital and of abattoir statistics and find that the most heavily infected zones are those in which most cattle are kept. Where cattle are scarce sheep are only lightly infected. Humidity may have some bearing upon this as cattle are only kept in the districts where there is most rain. The percentage of sterile cysts is, however, much greater in sheep than in cattle. The role of carnivores is the most important in the epidemiology of echinococcosis and the numerous pariah dogs which frequent the villages are doubtless responsible for the frequency of infestation.—E. L. Taylor.

Jones, T. L., & Kingscote, A. A. (1935). **Observations on Ascaris Sensitivity in Man.**—*Amer. J. Hyg.* **22.** 406-413. 2 tables. [7 refs.]

This work was carried out to probe into the conditions governing sensitization to contact with *A. lumbricoides* which up to the present have remained obscure. Cutaneous reactions to saline extracts of whole worms and various fractions were tried out on 108 students, 27 of whom proved to be sensitive. Sensitive individuals exhibit irritation of the eyes, sneezing, marked nasal and bronchial secretion, fits of coughing and asthmatic attacks. A preliminary period of exposure, but not of actual infection, appeared to be necessary to produce sensitization, but continued exposure was found to lead to desensitization. These observations may have some bearing on skin reactions used for diagnostic purposes.—E. L. Taylor.

LUCKER, J. T. (1935). **The Morphology and Development of the Infective Larva of *Cylicodontophorus ultrajectinus* (Ihle).**—*J. Parasit.* **21.** 381-385. 3 figs., 1 table. [3 refs.]

Eggs removed from females of this species were cultured in water at room temperature (20° to 26°C.). First stage larvae hatched out in 47 to 67 hours. Helminthologically sterile faecal extract was then added. Most larvae had reached the third infective stage 120 hours after the cultures had been started, the first ecdysis being completed after 96 hours. The skin was not cast after either the first or second ecdysis, so that the infective larva has two sheaths. The paper describes the inner one only – the only one usually retained by infective larvae. This is about three times as thick as the cuticle of the larva inside it and possesses, like the larva, longitudinal lateral alae ; it is 640 to 773μ long, extending 180 to 220μ beyond the short, round-tipped tail of the fully extended infective larva, this larva being 387 to 565μ long and 19 to 32μ wide, with eight intestinal cells. The anatomy of the larva is described and figured and a table gives measurements of its various parts. It is readily distinguished from the infective larva of *Strongylus equinus*, *S. edentatus* and *S. vulgaris*, but so closely resembles that of *Poteriostomum rátzii* that the fact that the latter has 16 intestinal cells is the only reliable point of difference.

More knowledge of the development and structure of the infective larvae of cylicostomes of horses is required.—G. LAPAGE.

TAYLOR, E. L. (1935). **Acute Parasitic Bronchitis in Adult Cattle caused by Immature Lungworms.**—*Vet. Rec.* **15.** 1280-1284. [2 refs.]

A careful study was made of an outbreak of acute parasitic bronchitis due to *Dictyocaulus* in a small herd of Jersey cattle ; faecal material was collected and *post-mortem* examinations carried out. Detailed stock records had been kept which rendered it easy to trace the movements of the cattle ; as one of the cows which died of the disease had recently been purchased and brought on to the premises only a few days before the outbreak occurred the history was particularly interesting.

It was concluded that fatal disease can be caused under natural conditions by immature lungworms in adult cattle before any evidence of infestation appears in the faeces ; that the relative resistance of the adult cattle rapidly breaks down on exposure to severe infestation that they may be brought to the point of death within 11 days of the first exposure to infection, and also that in the absence of reinfestation the lungworms carried by mature cattle are speedily eliminated. In addition, evidence was obtained which showed that the distribution of lungworm larvae in a pasture may be very uneven, and that an unprotected heap of cow manure may be a source of great danger in this disease.

HINMAN, H. (1935). **Studies on the Dog Heartworm, *Dirofilaria immitis*, with Special Reference to Filarial Periodicity.**—*Amer. J. trop. Med.* **15.** 371-383. 1 chart. [16 refs.]

Hinman made observations on the correlation between the number of adult female *D. immitis* and microfilariae in the peripheral circulation of 30 infected dogs, and found that the estimated number of microfilariae per adult female varied between 10,740 and 3,750,945, the figures thus representing a complete lack of correlation. One infected dog, which was carefully guarded against reinfection, was found to carry a constantly high number of microfilariae over a period of three years. Cyclical parturition of the female worm is not regarded by the author as a feasible explanation of periodicity in *D. immitis* infection, and it is thought that the cause is more likely to be found in some normal physiological process in the

dog. An effort was made to demonstrate the presence of chemotactic substances in the saliva of mosquitoes, but without success.—E. L. TAYLOR.

ISSAJEV, L. (1934). **On the Method of Penetration of the Guinea Worm Larvae into Cyclops.**—*Med. Parasitol., Moscow.* **3.** 212-230. 13 figs. [20 refs.] [In Russian : German summary]. [Copied *verbatim* from *Trop. Dis. Bull.* **32.** 653. Signed C. A. HOARE].

Working in Turkestan the author conducted a series of experiments with the view to determine the method by which the larvae of *Dracunculus medinensis* penetrate into the local vectors, *Cyclops oithonoides* and *C. vicinus*.

The copepods and the nematode larvae were placed together in watch-glasses containing distilled or filtered pond-water and were observed under a microscope. The cyclops actively hunts the larvae and ingests them. To facilitate the observation of the larvae within the body of the crustaceans, these were starved and placed between slide and coverslip sealed with vaseline. About 5-6 hours after ingestion, but sometimes after a few minutes, the larvae pass into the body-cavity of the cyclops by actively boring head first through the stomach wall. Active penetration of the larvae through the integuments of cyclops could not be observed under the most favourable conditions. Similar experiments conducted with a number of Cladocera showed that they were incapable of ingesting guinea-worm larvae, while those taken up by Diaptomus passed through its intestine and were discharged from the anal aperture unaltered. The paper contains a detailed illustrated account of the structure of the alimentary tract of cyclops and of its feeding methods.

ISSAJEV, L. (1934). **Experimental Dracontiasis in Dogs.**—*Med. Parasitol., Moscow.* **3.** 231-238. 5 figs., 3 tables. [7 refs.] [In Russian : German summary]. [Copied *verbatim* from *Trop. Dis. Bull.* **32.** 653-654. Signed C. A. HOARE].

Description of the results of experimental infection of dogs with *Dracunculus medinensis* undertaken in Turkestan between 1927 and 1932. Pups from 4 to 6 months old were starved for 24 hours and each given 100 cc. of water in which were infected cyclops, containing a total of 25-50 guinea-worm larvae, the last having moulted twice. Of 42 pups 27 became infected. Dissection of the worms at various periods of time (up to one year) following the infective meal showed that its development up to the production of ripe, motile larvae, takes 9-10 months. Males could not be found. In one case cyclops were infected with larvae isolated from a worm obtained in one of the experimental infections ; after developing for 13 days in the crustaceans 25 larvae were fed to another pup and gave rise to an infection with 5 adult worms the uteri of which contained motile larvae when examined about 9 months later. It is suggested that the successful experiments coupled with the finding of naturally infected dogs points to the latter as sharing with man the rôle of final hosts. The incidence of dracontiasis in the town of Old Bokhara was 30 of 30,000 of the human population and 5 of 2,023 dogs examined.

MARTIN, W. (1935). Technische Neuerungen für den Trichinenschau-Grossbetrieb. [**Apparatus for the Detection of Trichinosis**].—*Vet. Gesundheitsdienst.* Suppl. to *Prag. tierärztl. Arch.* pp. 30-36. 5 figs.

A description of the procedure for examining slaughtered swine for the presence of trichina cysts in the muscles, with special reference to the preparation of the compressed sections of muscle and their examination in a trichinoscope of the Reichert pattern.—J. E.

IMMUNITY.

PERAZZI, A. (1934). Le caratteristiche anallergiche della " Tubercolina spenta ". [**The Anallergic Character of " Extinguished Tuberculin "**].—*Profilassi.* **7.** 241-243. [8 refs.] [English, French and German summaries : abst. from orig.]

The specific flocculating power of Finzi's " extinguished tuberculin " on agglutinating antituberculous serum has been confirmed. The substance will not, however, produce a reaction in tuberculous patients. The author concludes that it must still contain a specific carbohydrate, but not the specific proteins present in exotuberculin, and that its special allergic properties should make it a valuable agent in the treatment of tuberculosis.—J. A. NICHOLSON.

BAKKER, S. (1935). Zijn de tuberculinereacties specifiek ? [**Is the Tuberculin Test Specific ?**]—*Ned.-ind. Bl. Diergeneesk.* **47.** 172-177. 1 table. [English and German summaries : abst. from orig.]

A report of 21 cattle found, after slaughter, to be infested with worms in the liver and/or lungs. When tested before death, with the ophthalmic and subcutaneous tuberculin tests, all the animals gave a doubtfully or weakly positive reaction with one or other of the tests, but were found to be free from visible tuberculosis lesions.—J. E.

BOISSEVAIN, C. H. (1935). **The Decomposition of Tuberculoprotein, Starch and Gelatin by Dry Grinding.**—*Amer. Rev. Tuberc.* **31.** 542-546. 1 table. [3 refs.]

The author, working with SCHAEFER, has already shown that when tubercle bacilli are ground in a ball mill they lose their acid-fastness and at the same time their power to provoke hypersensitiveness to tuberculin in guinea pigs, a change which might be due to the breaking up of the structure of the bacterial cells or to more profound changes in the physical or chemical character of the cell constituents. Boissevain has, therefore, tested the effect of long continued dry grinding (24 to 336 hours) of defatted tubercle bacilli, starch and gelatin in a ball mill. Prolonged grinding of starch causes it first to change to erythrodextrin and then into achroodextrin. Prolonged grinding of gelatin changes it into a peptone-like compound which is very soluble in cold water and unable to form a gel even at ice-box temperature. Defatted tubercle bacilli, which consist mainly of an insoluble compound of specific polysaccharide and tuberculo-protein, are broken up by prolonged grinding when mixed with water-soluble protein, peptone and polysaccharide. Treatment with cold 4 per cent. sodium hydroxide solution or boiling with dilute acid has a similar effect. Water-soluble protein is hydrolyzed into peptone in very dilute solutions.—A. W. STABLEFORTH.

PARISH, H. J., & O'BRIEN, R. A. (1935). **The Heat-Stability and " Tenacity " of Tuberculin.**—*Brit. med. J.* May 18th. 1018-1019. [3 refs.]

The authors have noted that bottles, pipettes, Berkefeld filter candles and syringes which have been used for tuberculin may still contain amounts of adherent tuberculin, sufficient to be detected by guinea pig inoculation, even after thorough washing and autoclaving. Since no reliable method of removing traces of tuberculin has yet been evolved, it is suggested that all apparatus used for this product should be restricted to that purpose, and that separate pipettes, syringes, etc., should be retained for different dilutions.—R. E. GLOVER.

Arbatskaia, E., & Moroskin, H. (1934). La reazione intradermica (I.D.R.) quale metodo diagnostico nella brucellosi. [**The Intradermal Reaction for the Diagnosis of Brucella Infection**].—*G. Batt. Immun.* **12.** 979-989. 2 tables. [English, French and German summaries : abst. from orig.]

No very satisfactory method for the diagnosis of brucella infection in human beings has as yet been elaborated, the more important of those at present in use being the agglutination test of blood serum and haemoculture. The authors compared the results obtained with these methods and with an intradermal test carried out with a polyvalent antigen prepared from human, bovine, ovine and porcine strains of brucella (four-day cultures washed off agar, inactivated by heating to 70°C., standardized to contain 500 to 2,000 million bacteria per c.c., and filtered). A total of 251 tests was made on healthy persons and on those suffering from brucella infection and other diseases. The results showed that the intradermal test was highly specific and superior to the other methods of diagnosis. No reaction was obtained, however, in advanced cases of the disease. For the intradermal test 0·1 c.c. of the vaccine was injected into the thickness of the skin and in positive cases a reaction followed in six to eight hours, lasting from 24 to 48 hours. The vaccine used was standardized and contained 500 million bacilli per c.c. ; this proved sufficient to produce a specific reaction which was not followed by necrosis at the site of injection.—J. A. Nicholson.

Serra, A. (1935). La valeur de l'intradermo-réaction à l'abortine pour le diagnostic de la brucellose expérimentale chez le chien. [**The Value of the Intradermal Abortin Reaction in the Diagnosis of Experimental Brucella Infection in the Dog**].—*Boll. Sez. ital. Soc. int. Microbiol.* **7.** 343-348. [16 refs.] [In French].

Four dogs were infected experimentally with *Br. abortus*. One died after 20 days : the remaining three were tested intradermally with abortin after intervals of one and two months and yielded negative reactions even though the agglutination titres of the blood serum were 1 : 400 to 1 : 500. The dogs were then destroyed and revealed no pathological changes. Attempts to cultivate *Br. abortus* from various organs also failed. It would appear that the presence of an allergic state is dependent upon the presence of the organism in the tissues.—Gwilym O. Davies.

Peterson, C. Emelia. (1935). **Are Brucella abortus Agglutinins in the Blood Stream Produced by Active or Passive Immunization ?**—*J. Lab. clin. Med.* **20.** 727-732. [8 refs.]

Br. abortus agglutinins appeared in the blood stream of guinea pigs in response to infection *per os*, but not to passive immunization nor to the administration of dead antigen. Agglutinins failed to appear in the serum of guinea pigs fed daily with agglutinins in the concentration usually found in milk. Similar results attended daily feeding of agglutinins in a concentration eight times greater than that usually encountered in milk, and daily feeding of killed *Br. abortus* cultures even when the intestinal mucosa was previously treated with bile. Oral administration of viable cultures produced active infection, as indicated by agglutination tests and by recovery of pure cultures of *Br. abortus* from the spleen at autopsy.—J. W. E.

Torrance, C. C. (1934). **Experimental Studies of Puerperal Infection. IV. The Effect of Pregnancy on the Haemolytic and Agglutinative Activity of the Blood Serum.**—*J. Immunol.* **27.** 531-538. 1 table, 2 graphs. [10 refs.]

The development of agglutinins in the sera of pregnant and non-pregnant rabbits was compared, following the intravenous injection of first dead and, later,

living cultures of *Proteus vulgaris*. No significant differences were observed. In all cases the embryos died *in utero* and were retained even after the completion of the period of gestation.—E. W. Ascoli.

Diernhofer, K. (1935). Abortus-Frischblutschnellagglutination und Weidewirtschaft. **[Rapid Fresh Blood Agglutination Test for *Brucella abortus* Infection].**—*Wien. tierärztl. Mschr.* **22.** 396-397.

This short note is a plea for the more general application of the whole-blood method of detecting agglutinins in the blood of animals affected with *Br. abortus*. The writer draws attention to the great handicaps of the poorer farmers and peasants in Austria whose financial resources, as well as the conditions under which they live, make it impossible for them to adopt any of the recognized methods of control or eradication.

He considers that systematic use of the above method of testing by the local veterinary surgeons would have immediate beneficial effects.—N. S. Barron.

Sachweh, P. (1935). Ueber eine Flockungsreaktion zum Nachweis des seuchenhaften Verkalbens. **[The Flocculation Reaction in the Diagnosis of Bovine Contagious Abortion].**—*Dtsch. tierärztl. Wschr.* **43.** 675-677.

The technique of the flocculation reaction and the principles underlying the test are outlined. Its usefulness is compared with that of the agglutination and complement-fixation tests. It is concluded that the flocculation and agglutination reactions are generally in close agreement and are superior to the complement-fixation test. It is claimed that the flocculation test reveals 5 per cent. of infected animals not revealed by agglutination. [It is not clear what ultimate criterion was adopted to decide whether animals really were infected with *Brucella abortus*].—E. J. Pullinger.

Cartana, P. (1935). Leishmaniose canine. Valeur de la réaction de gélification au formol et de la réaction au formol-stibosane pour le diagnostic. **[The Formol-Gel and the Formol-Stibosan Reactions in the Diagnosis of Canine Leishmaniasis].**—*C. R. Soc. Biol. Paris.* **120.** 63-65. [1 ref.]

This article records observations made on the serological reactions of 200 dogs, of which five were affected with leishmaniasis. The sera of 12 dogs gave positive reactions to both the formol-gel and the formol-stibamine tests, all those infected being in this group. Thirty-two other sera gave positive reactions to the formol-stibamine test, but negative reactions to the formol-gel test.—U. F. R.

DISEASES, GENERAL.

—. (1935). **Report of the Special Committee on Poultry Diseases [Amer. Vet. Med. Ass.].**—*J. Amer. vet. med. Ass.* **87.** 466-468.

A survey of the work on poultry diseases now being carried out in 18 eastern states was made by Dr van Roekel. Each state has certain facilities for work on poultry diseases, with power to quarantine, control and eradicate the communicable diseases. Coccidiosis, *Salmonella pullorum* infection, fowl paralysis, fowl pox, laryngotracheitis, coryza and internal parasites are reported as prevalent in the majority of states. Fowl paralysis, leucosis, neoplasms, fowl pox, *S. pullorum* infection, respiratory affections, epidemic tremor, entero-hepatitis, paratyphoid infections and diseases of brooder chicks are reported as being under investigation.

Inter alia, the following recommendations are made :- (1) standardization of

diagnostic methods, terminology, and methods of reporting ; (2) studies of diseases in birds other than domesticated, and (3) increased laboratory facilities and co-operation with workers on nutrition and genetics.—F. H. Manley.

Rudolf. (1935). Beitrag zur Bekämpfung und Aetiologie einiger in den ersten Lebensmonaten auftretenden Ferkelkrankheiten. [**Piglet Diseases**].—*Wien. tierärztl. Mschr.* **22.** 641-648.

The cause, symptoms, pathological changes and treatment of several diseases of piglets are discussed.

Inflammation of serous membranes and joints is a characteristic condition accompanied by fever with its usual train of symptoms. Lesions are characterized by sero-fibrinous exudate on serous or synovial membranes. The aetiology of the condition is obscure.

Sudden death of young pigs, unassociated with noteworthy changes other than slight inflammation of the alimentary tract, forms a well-recognized clinical entity. Before this condition can be diagnosed, however, worm infestation must be excluded. It is thought that the condition is associated with forced feeding of the parent sow. The possibility that mineral imbalance may be the cause is discussed. —E. J. Pullinger.

Van Es, L., & Olney, J. F. (1935). **Environment and Poultry Diseases.**—*J. Amer. vet. med. Ass.* **86.** 390-408. 1 table.

The authors carried out experiments over a period of five years to assess the value of hygienic precautions and to note the influence of environment when a poultry population was exposed to the causal organisms of *Salmonella pullorum* infection, blackhead, tuberculosis, *Pasteurella aviseptica* infection, coccidiosis and *S. gallinarum* infection. Two poultry populations, as similar as possible, were kept under different conditions ; in one case under conditions similar to those of a farm yard and in the other where strict sanitary precautions were taken. The birds received the same ration and were housed in a similar manner.

In the case of *S. pullorum* infection the experiments were not conclusive, but no evidence of infection was noticed in contact birds if egg eating was prevented. It appeared that environment did not play a great part in tuberculosis or *Past. aviseptica* infection, but in the case of blackhead and *S. gallinarum* infection marked differences in the mortality rate were noted.

Coccidiosis is discussed very fully and the authors point out that it is perhaps the most difficult disease to prevent and that special precautions are necessary even in a good environment.—J. E. Wilson.

Lesbouyries, M. (1935). Le pigeon voyageur et ses principales maladies. [**Diseases of Carrier Pigeons**].—*Rev. vét. milit.* **19.** 443-453.

A few diseases, such as those due to faulty breeding, training, feeding (especially overfeeding) and accidents are peculiar to the carrier pigeon. Birds examined after overfeeding followed by a long flight, have had ruptured spleens or their muscles have appeared to be degenerated and their blood dark and tarry. In analysing a large number of *post-mortem* examination findings, the author groups them into three classes : (1) 2,936 cases of parasitic disease including coccidiosis (*Eimeria pfeifferi*) and round worm infestations (*Ascaridia columbae* and *Capillaria columbae*) ; (2) 2,534 cases of pigeon pox and diphtheria : the flagellate *Trichmonas columbae* causes lesions of the pharynx, larynx and the intestines, particularly the cloaca, which simulate pox lesions ; (3) 1,349 cases of paratyphoid disease : most cases

are due to *Salmonella typhi-murium*, some are due to *S. enteritidis* and, exceptionally, to *S. paratyphi* B.

All these diseases are described, together with diagnosis, prophylaxis, control measures and treatment.—C. V. WATKINS.

BAASHUUS-JESSEN, J. (1935). **Arctic Nervous Diseases.**—*Skand. VetTidskr.* **25.** 310-345. [51 refs.] [In English : Swedish summary].

A valuable review of the literature, taken mostly from accounts of polar expeditions and books on the far-north countries, of diseases of dogs characterized by signs of fury and madness and called rabies by many writers. The author comes to the conclusion that rabies does not exist among dogs of the far north and suggests that the disease referred to is nutritional in origin, the chief factor being lack of fat, which is essential to health in very cold countries. [No mention is made of the absence – presumably unavoidable in the circumstances – of inoculation tests]. A systematic description of the disease is not given in the paper.

Apart from its general nutritional and pathological interest, the article is useful to those engaged in work entailing the use of dog sledges in Canada, Greenland, etc.—J. E.

KANTOROWICZ, R. (1935). Stuttgarter Hundeseuche (StHS.) = Weilsche Krankheit ? oder verwandt ? **[Stuttgart Disease and Weil's Disease].**—*Berl. tierärztl. Wschr.* **51.** 372-374. 2 tables. [8 refs.]

In support of the theory that Stuttgart disease of dogs is a form of Weil's disease (spirochaetosis) [this *Bull.* **5.** 742.], the author gives seven case records in which a polyvalent anti-spirochaete serum appeared to be of curative value. In two cases the blood showed agglutinins for a number of strains of spirochaetes [evidently isolated from the cases of Weil's disease in human beings].—J. E.

I. KRISPENZ, J. (1935). Ueber das Vorkommen von Fettsubstanzen in der Niere des Hundes mit besonderer Berücksichtigung der Stuttgarter Hundeseuche. **[Fat in Dog's Kidneys with Reference to Stuttgart Disease].**—*Wien. tierärztl. Mschr.* **22.** 545-553 and 588-596. [10 refs.]

II. WIRTH, D. (1935). Weitere Beiträge zum Stuttgarter Hundeseuche-Problem. **[Stuttgart Disease of Dogs].**—*Tierärztl. Rdsch.* **41.** 609-612. [7 refs.]

I. A detailed histological study of the kidneys of dogs that had died of Stuttgart disease and other diseases. The presence of fat was verified in most cases examined but was found to be non-specific for any one disease : similarly, interstitial nephritis was found in many cases of various diseases. Although WIRTH has shown nephritis to be practically constant in Stuttgart disease, it is not of prime value in the *post-mortem* diagnosis of this disease.

II. In continuation of an earlier article [this *Bull.* **5.** 742.] Wirth records the finding of spirochaetes in the kidneys of 14 cases of leptospiral jaundice and in ten cases of Stuttgart disease. Kidney suspensions from two cases of the former transmitted the disease to puppies after subcutaneous inoculation. Similar suspensions from cases of Stuttgart disease produced leptospiral jaundice in four out of seven series of puppies. Spirochaetes were seen in the kidneys of these puppies after death. Puppies so inoculated sickened in ten to 18 days and died at the end of a further one to five days. The infection was passaged several times in further puppies. The disease was also produced in puppies by the subcutaneous inoculation or ingestion of urine from wild rats captured from a canal at Vienna. —J. E.

Stark, A. M., Tiesenhausen, M. M., Gozanskaja, N. M., Skrozky, E. W., Schtschastny, D. S., & Zuk, W. A. (1934). Ueber die Pockenätiologie der sog. Melkerknoten. 1. Klinischer Teil. 2. Pathologischanatomischer. 3. Experimenteller Teil. 4. Veterinärmedizinischer Teil. [**The Aetiology of the So-Called " Milker's Nodules." I. Clinical Observations. II. Pathology. III. Experimental Work. IV. Veterinary Aspects.** (**A New Type of Sheep Pox in the Ukraine**)].—*Arch. Derm. Berl.* **170.** 38-60. 10 figs. [29 refs.]

I. In the autumn of 1931 an outbreak of eruptive skin disease occurred in abattoir workers handling sheep carcasses at Odessa, 21 male and 26 female workers being affected with an eruption on the hands, forearms and feet. Three case records are given in full. On clinical grounds the disease was diagnosed as " milker's nodules ", a form of cow pox.

II. The histological character of the lesions of six cases is described in detail ; the diagnosis was verified as a result of the work.

III. The variolous nature of the disease was further demonstrated by experimental infection of rabbits in which Paschen bodies were produced.

IV. A disease of sheep characterized by pustular stomatitis and dermatitis of the face and legs broke out around Odessa in the autumn and winter of 1931, morbidity in flocks varying from 20 to 70 per cent., the incubation period being about one month and the duration one to two weeks. General health was but little affected. This disease was undoubtedly the origin of the " milker's nodules " in the abattoir workers and positive proof was provided by one of the authors (Zuk) infecting his hand from the affected tongue of the slaughtered sheep. A typical " milker's nodule " developed and its variolous nature was confirmed by histological examination and infection of rabbits.

A table comparing this disease with ordinary sheep pox is given : the former was, in general, less severe than sheep pox, and sufficiently different to warrant its classification as an atypical sheep pox infection : its easy infectivity for man is a peculiar property not possessed by ordinary sheep pox.—J. E.

Szablowski, J. (1935). Oparzenia luizytowe skóry konia. [**Skin Burns in Horses Caused by Lewisite** (**Poison Gas**)].—*Wiad. weteryn.* **14.** 215-227. 3 figs. [9 refs.] [Abst. from French summary].

The horse is particularly sensitive to lewisite and frequently succumbs to poisoning by this gas. Skin burns caused by it are more dangerous than those caused by yperite, on account of the possibility that arsenic poisoning may supervene. Lewisite is difficult to eliminate from the skin, owing to the rapidity with which it is absorbed. Treatment with a 5 per cent. solution of sodium hydroxide is recommended : it is a slow process and, even when cured, horses are often unfit for any work. Sick horses should be kept in well-aired stables [see this *Bull.* **3.** 456].

Savage, A. (1934). **On Sterility.**—*Proc. 5th Pacif. Sci. Congr. Can. 1933.* pp. 3003-3011. [Numerous refs.]

This article is a concise summary of known facts concerning the functional and organic causes of sterility in the cow and the bull.—E. W. Ascoli.

I. Magnusson, H. (1935). Om massabort hos sto. [**Enzootic Abortion in Mares**].—*Svensk VetTidskr.* **40.** 143-159. [10 refs.] [A German version appears in *Dtsch. tierärztl. Wschr.* **43.** 417-421].

II. Wall, S. (1935). Utfodringsfel som orsak till kastning hos häst. [**Abortion in Mares due to Incorrect Diet**].—*Skand. VetTidskr.* **25.** 169-204. 11 figs., 9 tables. [1 ref.] [English summary : abst. from orig.]

I. Three different outbreaks of enzootic abortion in mares are described. During the autumn of 1928, 32 of 44 pregnant mares in a single stud aborted. The abortion was considered to be caused by an epidemic of influenza. Five years later (1933) a second outbreak occurred in the same stud and 28 out of 48 pregnant mares aborted. If a form of influenza were to be considered as the cause of this outbreak, animals that had been affected in the previous epidemic should have proved immune on this occasion and not have aborted, but this was not the case.

In another stud an outbreak took place in the season of 1934 to 1935, in which seven of 21 pregnant mares aborted. Bacteriological and serological examinations gave negative results.

A review is given of similar outbreaks recorded in the literature. They have frequently occurred in the United States of America where DIMOCK claims a specific virus to be the causal agent.

Of 113 expelled foetuses with placentas attached, all obtained from about 100 different farms examined at Malmö over several years, one showed staphylococcal and five showed streptococcal infections. Pure culture of a Gram-negative streptococcus isolated from one of the last-mentioned cases produced abortion in a pregnant mare on the 17th day when introduced into the vagina. The strain was re-isolated from the aborted foetus.

II. Wall deals with the second outbreak: it lasted from December, 1933 till the following May; the peak was reached in March, when 20 mares aborted in a fortnight. Two cases occurred in the 8th, 6 in the 9th, 7 in the 10th, 12 in the 11th, and one at the beginning of the 12th month of pregnancy.

Infection with visible micro-organisms could be excluded as the cause. Microscopic examination of material from eight foetuses revealed congestion and necrotic lesions of the livers and kidneys and petechiae of the serous membranes, indicating intoxication as the cause of death. As no other sources of poisoning could be found, attention was directed to the mares' food, which was oats, wheat bran, hay (chiefly timothy grass and a little clover), yellow carrots and a supply of calcium. The mares on this diet were frequently constipated and an enterotoxaemia probably occurred in the cases reported, resulting in the death of the foetuses and abortion. As hypocalcaemia was demonstrated in some of the mares and foetuses, and there was deficiency of calcium in the diet, calcium deficiency together with lack of vitamin E might have been indirect causes.

—GUSTAV NAERLAND (FARSUND).

LÁSZLÓ, F. (1935). Ueber die pathologische Anatomie des Eileiters des Schweines. [**The Pathology of the Fallopian Tube of Swine**].—*Dtsch. tierärztl. Wschr.* **43.** 673-675.

The author discusses the macroscopic and microscopic changes found in the Fallopian tubes of swine examined, on many of which ovariotomy had been performed.

The ovarian bursa may contain blood clots which become organized and united to its lining by fibrous tissue. A condition of hydrops of the bursa is also described. The oviducts may become much altered in position following ovariotomy, becoming adherent to one another or to the abdominal organs. Other sequelae are hydrosalpinx, pyosalpinx and, occasionally, formation of diverticula. Microscopic examination sometimes revealed heterotopia of the epithelium – islands of the latter being found embedded in the muscularis or serosa, often forming the lining of cysts. These conditions are considered to be due to errors of development.

Salpingitis was found to be usually bilateral and always chronic, and was

often accompanied by metaplasia of the columnar ciliated epithelium to the squamous non-keratinized type.

Cysticercus tenuicollis was the sole parasite found related to the oviduct. —E. G. White.

Behnke. (1935). Das Verhalten der Retikuloendothelien bei Pferden, die der Serumgewinnung gedient haben. [**The Reticulo-Endothelial System of Horses which have been Used as Serum Producers**].—*Berl. tierärztl. Wschr.* **51.** 714-717. 12 figs. on 1 plate. [16 refs.]

The author has studied the changes occurring in the reticulo-endothelial systems of six horses which had been used for the preparation of erysipelas serum. These animals had received injections of culture over periods varying between two and four months. Definite signs of stimulation of the reticulo-endothelial system were found in each case. In the liver, there was an accumulation of round cells in the periportal and perivascular connective tissue, and the capillaries were congested with round cells and macrophages. Haemosiderosis was marked and new vessels had formed in the interlobular connective tissue. The spleen contained a large amount of haemosiderin and the kidneys showed a non-inflammatory metaplasia, with collections of lymphoid cells and macrophages between the tubules. These changes subsided very slowly and were still clearly seen in the liver nine weeks after the last injection. They resembled those seen in equine infectious anaemia, but presented slight differences which were sufficient to assure the author that the horses were not themselves suffering from this disease.—J. A. Nicholson.

Matthew, A., & Thomas, A. D. (1935). **Goitre in Afrikander Calves.**—*J. S. Afr. vet. med. Ass.* **6.** 128-132. 2 figs. [2 refs.]

The authors describe goitre in calves on a farm in the Eastern Cape Province. The condition appeared to be hereditary and was associated with the progeny of a particular bull. A *post-mortem* examination was made on one case and the histological appearance of the enlarged thyroid was found to be one of struma diffusa parenchymatosa. It was not associated with the occurrence of goitre in human beings. Goitre in calves has not been recorded in South Africa from areas in which human goitre exists. Treatment with potassium iodide had no beneficial effect. —E. M. Robinson.

Garzia, G. (1935). Contributo alla conoscenza delle cosidette " cisti ematiche " delle valvole cardiache degli animali domestici. [**So-Called " Blood Cysts " in the Cardiac Valve of Domestic Animals**].—*Nuovo Ercol.* **40.** 353-380. 7 figs. [Numerous refs.]

The presence of small, localized, capsulated nodules on the cardiac valves of domestic animals and man have frequently been reported. These have been considered either as vascular dilatations or true malformations in the development of the valves. The author has been able to collect 20 examples from 100 lambs as well as nine from dogs and three from cattle. The nodules were found on both the tricuspid and mitral valves, but never on the semilunar valves. They varied in size between that of a pin-head and of a pea and always possessed a capsule. They were usually situated on the marginal borders, occasionally at the centre and less often at the bases of the valves. Their position corresponded to the filamentous insertion of the cordae tendinae in the so-called subendocardial layer of the valve. Histological examination showed that the capsule was composed of connective tissue and elastic fibres, and was lined with vascular endothelium. Blood or a sero-sanguineous fluid was always present in the interior of the nodules.

From their structure and position, the author considers them to be the result of a telangiectasis caused by a sudden increase of tension on the valve during early life.—J. A. Nicholson.

Marshall, C. J. (1935). **Periodic Ophthalmia.**—*J. Amer. vet. med. Ass.* **87.** 534-541. [3 refs.]

This paper is a reiteration of present-day knowledge and ideas in regard to periodic ophthalmia of horses. It gives a straightforward account of the disease but no new material is contributed. The paper is in five sections, devoted to the history of the condition, its present distribution throughout the United States of America, symptoms, treatment and aetiology, the last in special reference to a preliminary report of an American commission for the investigation of diseases of the eyes of horses.

The idea that the disease in its primary state is one of city stables is disputed, the author being of the opinion that it generally has its origin on the farm. Dampness of stables is considered to be the factor of chief significance.—C. Davenport.

Jepsen, A. (1935). Nogle problemer vedrørende haardmaelkethed hos koen, belyst gennem undersøgelser over forekommende patologiske forandringer i pattespids og maelkekammer. **[Causes of Difficult Milking in Cows].**—*Medlemsbl. danske Dyrlaegeforen.* **18.** 205-227. 5 figs. [17 refs.]

A survey is given of earlier investigations of the problem. As the result of *post-mortem* examinations of 500 teats of cows (material from an abattoir), the following abnormalities were found :– 36 teats had ring or star-shaped cicatrices or haemorrhages of the mucous membrane of the cistern ; eight had contusions or wounds on the surface of the tip ; 126 showed inflammatory conditions of the mucous membrane similar to those which follow chronic mastitis ; three had partial septa due to cicatricial tissue ; in 24 the mucous membrane had a reticular structure which was regarded as a structural peculiarity and not a pathological condition ; 72 teats had papillomatous vegetations on the rosette at the upper end of the teat sphincter and 11 showed a thickening of the mucous membrane of the teat channel. 56 per cent. of all teats examined showed abnormalities. Only the last two categories mentioned (30 per cent. of teats examined) are supposed to cause " hard milking ".

For the removal of the papillomata the author recommends a papillomatome designed by Knudsen (a Danish veterinarian). Other abnormalities of the teat channel are treated by the use of teat slitters.—H. C. Bendixen (Copenhagen).

von Mócsy, J. (1935). Untersuchungen über die Ausscheidung des Myoglobins durch die Nieren. **[The Excretion of Myoglobin by the Kidneys].**—*Arch. wiss. prakt. Tierheilk.* **69.** 8-15. [4 refs.]

It is now well known that the colour of the urine in cases of equine haemoglobinaemia paralytica is due to myoglobin and not haemoglobin, and it has been suggested that a better name for the condition would be myoglobinuria paralytica [see this *Bull.* **1.** 234]. In the present paper it is shown that, whereas even small intravenous injections of myoglobin solutions will pass directly into the urine, haemoglobin has to be injected in very large amounts, 20 to 30 times the total content of the blood, before it can pass through the kidney into the urine. The kidneys possess an elective affinity for myoglobin as compared with haemoglobin and the author concludes that the easy passage of myoglobin through the kidney is due to this and not to any degeneration of the kidney. The elective capacity of the kidney for myoglobin is probably associated with its chemical characteristics.
—James Stewart.

Cocu, M. (1935). Contributions à l'étude de la parésie myohémoglobinurique. **[Contributions to the Study of Equine Myoglobinuria Paralytica].**—*Bull. Acad. vét. Fr.* **8.** 429-435. 1 fig.

This paper is a review of certain communications received by the author from three practising veterinarians on their experiences of equine myoglobinuria paralytica. The observations in question are mainly of a clinical nature, but special consideration is given to the following points :– the occurrence of cases of the disease on hot summer days ; lesions of the masseter muscles ; the value of bleeding in treatment, and aggravation of the disease by movement of the patient.

—C. Davenport.

Bechtold, E. (1935). Chemische und spektrale Myoglobinnachweise in pathologischem Pferdeharn durch die Cytochromreaktionen. **[Demonstration of Myoglobin in Urine of Horses by Cytochrome Reaction].**—*Berl. tierärztl. Wschr.* **51.** 565-566. [5 refs.]

Earlier work has established that myoglobin may be distinguished from haemoglobin and acid metamyoglobin by means of spectroscopic examination. The author has confirmed this from the examination of urine from two horses suffering from supposed haemoglobinuria. Both samples of urine were brownish red in colour and alkaline, and there was absence of the absorption band in the red characteristic of acid metamyoglobin. They showed, however, absorption bands, characteristic of oxymyoglobin and another band in the region of acid haematin. On treatment with hydrazine hydrate, absorption bands typical of cytochrome appeared and, on shaking with air, the cytochrome was reconverted into oxymyoglobin. On the addition of pyridine, haemochromogen was formed. If a significant amount of myoglobin leaves the muscles, contraction is no longer possible and, in severe cases, degeneration and atrophy of the contractile tissues follow.

—J. A. Nicholson.

Coles, A. C. (1935). **Virus Bodies in the Pericardial Fluid of Rheumatic Fever and other Conditions, and in the Joint Fluid of Rheumatoid Arthritis.**—*Lancet.* **229.** 125-126. 5 figs. on 1 plate. [1 ref.]

In this article the author, as the result of an independent investigation, confirms the work of Schlesinger, Signy and Amies [this *Bull.* **5.** 724.] on the presence of elementary bodies in cases of acute rheumatism. These particles were demonstrated by staining films prepared either from the pericardial exudate or from a suspension of the inflamed pericardium in broth. The slow Giemsa method gave the most satisfactory results. These bodies were smaller in size than the Paschen bodies of vaccinia and were estimated at from 0·17 to 0·26μ in diameter. The possible relationship of these particles to a filtrable virus is discussed.

—R. E. Glover.

Patay, R. (1935). Ostéite fibreuse, ostéo-fibrome et troubles endocriniens chez la poule. **[Osteofibrosis in the Fowl].**—*C. R. Soc. Biol. Paris.* **120.** 441-444. 4 figs. [1 ref.]

Several fowls remained stunted on a large well-kept poultry plant and showed swellings of the legs. On *post-mortem* examination the whole skeleton (except skull, vertebrae, pelvis and phalanges) was swollen and roughened externally and the cavities of the long bones were occluded. Hypertrophy of the parathyroids was the only other lesion found.

The author describes the histology of these bone lesions and also a similar condition found in recently-castrated capons. He suggests an endocrine origin in each case.—C. V. Watkins.

Brochet, L. (1935). Ostéite hypertrophiante chez la poule. [**Hypertrophying Osteitis in the Fowl**].—*Bull. Acad. vét. Fr.* **8.** 194-196 and 477. 1 fig.

The author reports a case in a fowl of hypertrophying osteitis, which principally affects the limbs, especially the leg bones, but not the head, vertebral column or pelvis. The diaphyses of affected bones are greatly enlarged and are very dense. The skin, beak, muscular system and viscera appear to be quite normal. Comparison is made with osteitis produced by seven different diseases including hypervitaminosis, acromegaly, tuberculosis and gigantism, but the differences in each case are distinct. A hypothesis is advanced that the disease originates as an acute infection of the pulmonary system, spreading to the air sacs and thence, ultimately, to the bones, possibly aided by an endocrine dysfunction.

Attention is drawn to a previous report of the same disease [Pugh, L. (1927). *Vet. Rec.* **7.** 189.], which appeared as an outbreak amongst cockerels six to seven months old and affected 5 per cent. of the flock. Lesions were found similar to those described above, accompanied by testicular atrophy and, occasionally, hypertrophy of the thyroid.

[Cases of this, or a similar disease, have been known to occur in Australia and New Zealand, whilst similar pathological manifestations are described by Jungherr – this *Bull.* **6.** 68].—Alfred Eden.

Pallaske, G. (1935). Ueber Osteodystrophia fibrosa beim Hund. (Beitrag zur Frage der Knochensystemerkrankungen der Tiere). [**Osteodystrophia Fibrosa in the Dog**].—*Tierärztl. Rdsch.* **41.** 577-582. 2 figs. [13 refs.]

A study of the skeletal system of a dog suffering from bony malformations showed beyond any doubt that in this particular case bone tissue had been laid down and had subsequently been reabsorbed. This was a case of osteodystrophia and not of rickets. The possible ways in which the removal of minerals from the bone may be brought about are discussed.—E. J. Pullinger.

Mills, R. H. (1935). **Bone Weakness due to Nematode Infestation in Animals on Ladino Clover Pasture.**—*Vet. Med.* **30.** 424-428. 10 figs., 2 photographs.

The author is of opinion that Ladino clover, a crop of considerable economic importance in Californian agriculture, is particularly liable to become heavily infested with nematode larvae. Three outbreaks of illness in cattle and sheep are described, in which the symptoms were weakness, emaciation and severe diarrhoea, associated in two of the outbreaks with abnormalities in the structure of the long bones, which were rendered particularly liable to fracture.

Reference is made to Stewart [this *Bull.* **4.** 748.], who concluded that nematode infestation, besides inhibiting the absorption of protein, also interfered with the calcium and phosphorus metabolism of the hosts, and thus both skeletal and tissue growth were retarded. The author suggests that a similar association of pathogenic factors obtained in the outbreaks of disease which he describes. —J. R. Greig.

de Kock, Fourie, Quin, Mönnig, Graf, & Kellermann. (1935). **Anaemia in South African Domesticated Animals.**—*S. Afr. med. J.* **9.** 443-448.

This article is a symposium in which the subject is approached by each author from his own particular standpoint. The subject is discussed under five headings :– (a) anaemias associated with alterations, destruction, etc., of erythroblastic tissues ; (b) anaemias associated with injury to the red cells by viruses, by bacteria, by protozoa and by various poisons ; (c) anaemias associated with haemorrhage as a result of traumata, verminosis, etc. ; (d) anaemias associated

with nutritional disturbances and deficiencies, and (e) anaemias as a sequel to certain diseases, e.g. blue tongue, tuberculosis, rickets, etc.

Under (a), various leucoses or leucaemias of fowls are described. Under (b), infectious anaemia, piroplasmosis and anaplasmosis are discussed and the toxic effect of methylene blue in large doses, producing a severe anaemia. A peculiar condition of unknown aetiology, known as enzootic icterus, is described.

In discussing the anaemia produced by worm parasites such as *Haemonchus contortus*, Fourie considers it to be due to loss of blood both from the ingestion by the parasite and the bleeding which continues after the worm detaches itself. Nutritional anaemias, such as occur in the human being, do not appear to have been recorded in domesticated animals in South Africa but have been described in New Zealand and in Kenya. A severe anaemia in sheep in South Africa, caused by *Eperythrozoon ovis*, has been seen in recent years.—E. M. Robinson.

Orr, J. B. (1935). **Discussion on Nutritional Anaemias. The Rôle of Inorganic Elements in Nutritional Anaemia.**—*Proc. R. Soc. Med.* **28.** 469-475. [58 refs.]

The metabolism of iron and copper is briefly discussed, as well as the requirements of these elements by various species of animal. For absorption of iron the salts must be in an ionizable state, i.e. the ferrous state. Therefore, the greater proportion of the iron in milk is readily absorbed, but only between 40 and 60 per cent. of that in cereals is available. The presence of acid in the stomach converts many iron compounds to a soluble form, and even in the case of achlorhydric stomachs the acidity due to the presence of organic acids is occasionally sufficient to allow a little of the ferric iron to become reduced to the ferrous state. There is little reliable information on the requirements of any of the species to prevent anaemia in later life, but in the case of anaemia of sucking pigs it has been computed that 25 mg. per day is sufficient to prevent the onset of clinical symptoms. The importance of copper as a factor in the formation of haemoglobin is emphasized and it is shown that, although milk is poor in copper, the young of most species are born with a store of copper in their liver.

Anaemias in the sucking pig, young lamb and chick appear to be straightforward instances of iron deficiency in the early stages of life, and can be cured by an adequate amount in the diet. The aetiology of anaemia in herbivora seen in many different parts of the world – called " bush sickness " in New Zealand, " nakuruitis " in Kenya and " pine " in Scotland – is still obscure. In some cases the administration of iron and salt mixtures effects a cure, but it is well understood that the condition is not due to a simple iron deficiency [see this *Bull.* **5.** 40, and 582].—James Stewart.

Knoop, C. E., Krauss, W. E., & Washburn, R. G. (1935). **The Development of Nutritional Anemia in Dairy Calves.**—*J. Dairy Sci.* **18.** 337-347. 2 figs., 3 tables. [Numerous refs.]

The authors described controlled experiments, the object of which was to determine whether a diet consisting only of whole milk, fed over prolonged periods, represented a complete food for dairy calves.

In the control groups, the milk was supplemented daily by 400 mg. iron as ferric chloride and 40 mg. of copper as copper sulphate. In one group of controls, after the calves had reached the weight of 200 lb. the iron was increased by 200 mg. and the copper by 20 mg. for every 100 lb. additional gain in weight. Physical appearance, growth, determinations of the number of erythrocytes, amount of haemoglobin in the blood and *post-mortem* examination showed that the calves on milk alone developed a nutritional anaemia, while those receiving the iron and

copper supplements in adequate amounts did not do so, but throve rapidly. In the case of the control groups, the testes and spleen were much larger than in those suffering from nutritional anaemia.

Further evidence that the liver acts as a storehouse for iron and copper was found in the fact that these substances were present in much higher concentration in the livers of the control calves.—J. R. GREIG.

FRASER, A. H. H. (1935). **The Role of Nutrition in Prevention of Disease in Farm Animals.**—*Nutr. Abstr. Rev.* **5.** 295-305. [Numerous refs.]

A selective survey is given of the literature dealing with food and mineral metabolism. Animals growing rapidly, breeding regularly and milking heavily require more P than most natural pastures can afford. The present practice in feeding livestock is suffering from the dangers of a little learning, and is too exclusively concerned with digestibility, starch equivalents and nutritive ratios. It is suggested that there are present in natural foodstuffs some vital factors so far undiscovered. No conclusive evidence is available of the effect of nutrition on infective diseases in farm animals, although presumptive evidence exists. Where a growing calf is to be used for breeding and maintained in good health, it should be fed as nearly as possible on its natural food – abundance of milk and grass. —H. DRYERRE.

COLES, J. D. W. A. (1934). **A Peculiar Nutritional Disease of Chicks.**—*Fmg S. Afr.* **9.** 319. 2 figs.

A condition is described which occurred in chicks three to six weeks old, feeding on an apparently normal ration. Complete or partial paralysis of the legs occurred, the toes being turned inwards and contracted. The disease was attributed to a lack of some constituent in the diet, probably a vitamin. Feeding of whole milk, butter milk or sour milk usually resulted in recovery in a few days. Lucerne and meat meal contain the missing constituent.—E. M. ROBINSON.

NATUCCI, G. (1935). Calcio, fosforo e riserva alcalina nell'osteopatia rachitiforme da stronzio. [**Calcium, Phosphorus and Alkali Reserve in a Bone Disease Resembling Rickets and Caused by Strontium Salts**].—*Biochem. Terap. sper.* **22.** 385-389. [20 refs.]

It has been shown that strontium in therapeutic doses exercises beneficial effects on the urinary, digestive and nervous systems ; in toxic doses, it produces acute haemorrhagic nephritis, diarrhoea, paraplegia or polyneuritis, and changes in the bones resembling those seen in rickets or following a diet poor in calcium and rich in phosphorus. In order to study the bone changes, young rabbits were given increasing doses of strontium lactate *per os* for 60 days. The bones were then submitted to radiological and histological examinations and the calcium, phosphorus and alkali reserve of the blood estimated. It was found that the strontium had been deposited in the bones at the expense of calcium and changes typical of rickets were seen. There was a hypercalcaemia and a hypophosphoraemia and a diminution in the alkali reserve. Irradiated ergosterol did not prevent the decalcification of the bones.—J. A. NICHOLSON.

DE GIER, C. J. (1935). Reisziekte (Transit Tetany) bij pony's. [**Transit Tetany in Ponies**].—*Tijdschr. Diergeneesk.* **62.** 1186-1197. [5 refs.] [English, French and German summaries : abst. from orig.]

A type of transit tetany occurred in Welsh mountain ponies which had been

shipped from England to Rotterdam. Only lactating mares were affected. Symptoms included paresis, rapid breathing, increase of temperature, muscular twitching, polyuria and sweating. Blood tests revealed hypocalcaemia, hypermagnesaemia and a high phosphorus content. These findings are contrasted with those of GREEN, ALLCROFT and MONTGOMERIE [this *Bull.* **5.** 581]. Intravenous injections of preparations containing calcium and magnesium relieved the condition. —E. J. PULLINGER.

BRYAN, O. C., & BECKER, R. B. (1935). **The Mineral Content of Soil Types as Related to " Salt Sick " of Cattle.**—*J. Amer. Soc. Agron.* **27.** 120-127. 1 fig., 2 tables. [20 refs.]

Analyses for total calcium, phosphorus, iron and copper were carried out on 40 range soils of Florida, of which 17 were " healthy " soils, while 21 were mineral and two were organic soil areas on which cattle developed " salt sick ". The surface soil of healthy areas contained on the average ten times the iron, twice the copper and five times the calcium and phosphorus of the affected areas. " Salt sick " is more prevalent on sandy than on heavier soils, it occurs in phosphorus-deficient areas and is as prevalent on calcareous soils as on those low in lime. Cattle develop " salt sick " on soils containing 0·036 per cent. Fe and 3·85 parts per million Cu, but remain healthy on those of 0·42 per cent. Fe and 8·56 p.p.m. Cu content. The addition of $CuSO_4$ to samples of " salt sick " soils increased the growth of mustard plants under controlled conditions.—ALFRED EDEN.

WRIGHT, J. G. (1935). **A Disease of Metabolism in Sheep. Report of an Outbreak of Disease in Lactating Ewes and Thought to be Due to Disturbance of the Mineral Balance of the Blood.**—*Vet. Rec.* **15.** 1253-1255. [7 refs.]

Details are given of two outbreaks of lambing sickness which affected 52 ewes out of a total of 277. These had lambed two to five weeks previously and had been transported by rail to their new grazing. Thirty-two died before treatment was commenced. Of the remaining 20, 16 recovered after Ca + Mg therapy. Another batch of 80 ewes with their lambs, transported by motor lorry, was not affected. Reference is made to the similarity of the condition to transit tetany in ponies. No blood examinations were made.—H. DRYERRE.

GUTTERIDGE, H. S. (1935). **The Effect of Feeding Deaminised Vs. Untreated Cod Liver Oils upon Growth, Egg Production and Mortality of Poultry.**—*Sci. Agric.* **15.** 771-772. [French summary].

Cod liver oils often contain nitrogenous impurities associated with a high content of free fatty acids. In feeding to poultry an oil of this type, as compared with one suitably deaminized without destruction of vitamins, the nitrogen-containing oil had a more deleterious effect upon growth, especially of cockerels, and on egg-production, with an increased mortality rate. No actual numerical data are given.—ALFRED EDEN.

GOLDING, J., & FOOT, A. S. (1935). **Avitaminosis A in Pigs.**—*Agric. Progr.* **12.** 123-126. [Copied *verbatim* from *Nutr. Abstr. Rev.* **5.** 560. Signed A. H. BLISSETT].

A ration of 50 parts barley meal, 35 parts middlings, 8 parts soya bean meal, 5 parts meat meal, 1¾ parts ground limestone and ¼ part salt was found unsatisfactory for sty fed pigs. The addition of vitamin A, but not of vitamin D, concentrates to this diet resulted in normal growth being resumed.

Almquist, H. J., & Stokstad, E. L. R. (1935). **Dietary Haemorrhagic Disease in Chicks. [Correspondence].**—*Nature, Lond.* **136.** 31. [6 refs.]

The antihaemorrhagic factor, specific against the nutritional disease of the chick characterized by internal haemorrhages and gizzard erosion, is present in the unsaponifiable, ether-extractable fraction of dehydrated alfalfa and in moist fish meal or rice bran, where it is possibly produced by the action of micro-organisms ; very little is present in wheat or yellow maize.—Alfred Eden.

Jackson, C. (1935). **Neoplasms in Domestic Animals.**—*S. Afr. med. J.* **9.** 481-484.

In discussing the subject of neoplasms in domestic animals, the author comments on the fact that no satisfactory definition of a tumour exists, and mentions that the neoplasms are distinguished by several criteria and then only under certain conditions. The greater proportion of tumours arising from the middle germ layer in birds is mentioned. After discussing the morphology and physiology of neoplasms, the causation in domestic animals is discussed. The age incidence factor plays a part, as in the human being. Domestication and habits of animals would not appear to have any influence in the causation of neoplasms.—E. M. R.

Valade, P. (1935). Néphrome á cellules claires (hypernéphrome) du chien. **[Clear Celled Renal Epithelioma in the Dog].**—*Rec. Méd. vét.* **111.** 577-582. 6 figs. [2 refs.]

An eight-year-old dog was destroyed on account of a large tumour in the left subscapular region which was adherent to the adjacent muscles. On *post-mortem* examination, an epithelioma was found involving the inferior half of the right kidney but not the pelvis. The neoplasm was pearly white in colour, encapsulated and firm except for a few areas in its interior which were undergoing degeneration. In addition to the metastasis mentioned above, others were present in the lungs, heart and jejunum. One was situated in the heart, immediately below the tricuspid valve although there was no history of cardiac disturbance. The cells were arranged in long rows, possessed a clear protoplasm with oval or rounded nuclei and contained glycogen. Their membranes were thick and translucent and the interstitial tissue was composed of bundles of fine collagen fibres and capillaries.—J. A. N.

PUBLIC HEALTH.

Pfaff, F. (1935). Ueber die Notwendigkeit einer richtigen Standespolitik, unter dem Gesichtswinkel voller Würdigung der Bedeutung der Veterinär-Medizin für den Schutz der menschlichen Gesundheit. **[The Role of the Veterinarian in Public Health Services].**—*Vet. Gesundheitsdienst.* Suppl. to *Prag. tierärztl. Arch.* pp. 5-10.

This paper deals with the need for the services of the veterinarian in relation to public health.—G. Dods Munro.

—. (1935). **Report of the Special Committee on Meat Hygiene [Amer. Vet. Med. Ass.]**—*J. Amer. vet. med. Ass.* **87.** 431-442.

The Special Committee on Meat Hygiene passed a resolution authorizing the appointment of a special committee to obtain full information on :- (1) the number and location of commercial abattoirs ; (2) the volume and character of business conducted, and (3) such evidence as might be obtainable to indicate the need of establishing an adequate system of inspection as a public health and livestock

measure. The committee wish to create a demand for more veterinarians in meat inspection, with a view to ensuring 100 per cent. food inspection in the United States of America as, at the present, only approximately 60 to 70 per cent. of all meat offered for human consumption is adequately inspected. Meat inspection is a public health and a national defence service, and the committee insist that it is also a veterinary service, and that meat which is now exempt should be included in such services.—BRENNAN DEVINE.

I. BERGER, H. C. L. E. (1935). Unification des méthodes d'inspection des viandes et de l'hygiène des viandes. [**Uniformity of Meat Inspection Methods**].—*12th Int. vet. Congr. 1934.* **3.** 389-400. [English, German and Spanish summaries : abst. from orig. in French].

II. YOUNG, T. D. (1935). **Uniformity in the Inspection of Imported Meat and Meat Products.**—*Ibid.* 401-406. [French, German and Spanish summaries].

III. JOSS, E. C. (1935). **National Meat Inspection in the United States of America.**—*Ibid.* 406-419. [French, German and Spanish summaries].

IV. —. (1935). **Discussion of Papers on Meat Inspection.**—*Ibid.* 419-421.

I. & II. The object of the first two papers is, as far as possible to standardize meat inspection in all countries, especially in those between which meat and meat products form an important part of commercial transactions, to have all meat inspection conducted by government-appointed veterinarians, and to have the products stamped officially so that the presence of the stamps on any meat or meat products can be accepted by any importing country as a guarantee that the food has been passed as suitable for human consumption after *ante-mortem* and *post-mortem* examination.

At present, some countries accept meat which other countries reject, thus making it difficult for inspectors and shippers in exporting countries to keep in mind what each country will or will not accept. While it must be left to the importing countries to check the value of inspection in the exporting countries by making periodical examinations of consignments, the acceptance of an agreed standard as to what is considered suitable for human consumption would obviate much of the inspection and interference with trade at the ports of landing. To obtain this desirable arrangement, the matter should be dealt with through the League of Nations, which should set up a committee for this purpose. [It is understood that, since these papers were written, a committee has been formed by the League of Nations and has drawn up draft certificates for consideration].

III. Joss describes in detail national meat inspection as it exists in the United States of America, and traces back its origin. Figures are given showing the great volume of trade carried on in the U.S.A., the numbers of federal-inspected slaughtering establishments, animals examined, personnel (800 veterinarians and 1,700 assistants), hygiene required, system of *ante-mortem* and *post-mortem* examinations, control of rejected material with marking and labelling of all products passed as fit for human consumption.

IV. In this discussion, PECEGO outlined the existing system of meat inspection in Brazil ; this is now being extended as Brazil is a country with inexhaustible reserves of cattle which are being improved by breeding in order to be suitable for export as meat to any country requiring it.—T. DUNLOP YOUNG.

I. LOTHES, R. (1935). Zur baulichen Ausgestaltung und veterinärpolizeilichen Ueberwachung der Schlachtviehhöfe. [**Construction and Veterinary Supervision of Abattoirs**].—*Berl. tierärztl. Wschr.* **51.** 665-671 and 680-684. 2 figs., 1 table.

II. Bourmer. (1935). Das Schlacht- und Viehofwesen der Stadt Köln. **[The Cattle Market and Abattoir of Cologne]**.—*Ibid.* 693-695.

I. As an example of a well-designed abattoir, a rough plan of the state abattoir of Cologne is given and the features of the design are discussed. Those interested are referred to the original article which is unsuitable for abstraction.

II. The capacity of the market and abattoir is discussed. Referring to the activities of the diagnostic laboratory attached to the abattoir, it is stated that during 1934 organisms belonging to the paratyphoid-enteritidis group [*i.e.*, genus *Salmonella*] were isolated from 74 samples of organs.—E. J. Pullinger.

Bartel, H. (1935). Die Typendiagnose bei der bakteriologischen Fleischuntersuchung. **[The Typing of Bacteria at Bacteriological Meat Inspection]**. —*Berl. tierärztl. Wschr.* **51.** 760-762. [1 ref.]

It is emphasized that for the accurate determination of members of the genus *Salmonella* a study of antigenic structure is essential. In such a study attention must be paid not only to the " H " and " O " antigens of smooth cultures, but also to the " type " and " group " phase of the " H " antigen. Technical procedures for carrying out such studies are discussed.—E. J. Pullinger.

Conte, M. A. (1934). La loi du 7 juillet, 1933 dans ses rapports avec la législation sur la police sanitaire, l'inspection des viandes et la jurisprudence commerciale vétérinaire. **[The Law of July 7th, 1933, in its Relation to Public Health Law, Meat Inspection, and Veterinary Commercial Jurisprudence (France)]**. —*Rev. gén. Méd. vét.* **43.** 50-60, 118-125, 178-188, 245-254, 310-318, 377-383, 439-446, 504-510, 568-574, 770-775 and 817-821, and **44.** 55-60, 120-124, 180-188, 303-317 and 375-383. 2 tables. [3 refs.]

The French law of the 3rd July, 1933, deals with two subjects, the control of bovine tuberculosis and the inspection of meat. Conte in this series of articles discusses and criticizes the provisions made.

Bovine Tuberculosis.—The Act provides for the free tuberculin testing of cattle by state veterinary officers at the voluntary request of stock-owners. This collaboration of the stock-owner with the veterinary services is considered to be essential to the eradication of the disease. The method of control is left to be determined by rules to be published by the government department concerned. These rules will define what compensation, if any, is to be given to stock-owners and what charge, if any, is to be made for the tests. In certain circumstances it is contemplated that there will be compensation for losses due to the seizure of carcasses of animals slaughtered on account of disease and reimbursement of the expenses of repairing and rebuilding stables. Conte shows that the wording of the law is here and there ambiguous. It revises the list of diseases reputed to be contagious, but does not alter the provision of the Act of 1898 that the department may add to the number of scheduled diseases.

The author makes an exhaustive survey of previous legislation and shows how it is amended by the present Act.

The Act makes provision for the seizure of meat from tuberculous animals and for the regulation of the importation, manufacture, sale, possession and use of tuberculin. The importation, manufacture and sale of all preparations for the diagnosis, prevention or treatment of tuberculosis is prohibited except under licence from the Ministry of Agriculture. Veterinary surgeons alone have the right to make use of these preparations in accordance with rules to be issued by the department.

Bovine tuberculosis is made a redhibitory vice, *i.e.* its presence in an animal

may nullify the contract of sale at the will of the purchaser. The forms of tuberculosis which give rise to the action for breach of contract are clinical tuberculosis and tuberculosis disclosed by means of an approved tuberculin test. The author devotes considerable space to the French law of warranty in each case and concludes that the law of July, 1933, is defective in many respects.

Meat Inspection.—In abattoirs and slaughterhouses, other than communal and intercommunal abattoirs and private slaughterhouses placed under the permanent supervision of veterinarians by the local authority, the inspection of meat must be carried out by veterinarians appointed by the Ministry of Agriculture. This dual control of meat inspection leads to difficulties which are fully discussed in this series of articles. Inspection of meat in markets and shops is also under veterinary supervision. Provision is made for penalties for illicit stamping of meat.

In no case is the owner legally liable in cases of slaughter of sick or injured animals, if the slaughter is carried out in a slaughterhouse under veterinary inspection. This clause, the author thinks, will give rise to serious difficulties. —F. Bullock.

Weyrauch, F., Kairies, A., & Müller, H. (1934). Untersuchungen zum jetzigen Stand der Milchhygiene. [**Investigations into the Present Position of Milk Hygiene in Germany**].—*Arch. Hyg., Berl.* **113.** 19-28. 1 table. [16 refs.]

In order to ascertain the degree of cleanliness of milk and to test the efficacy of measures adopted to ensure a clean milk supply, 124 samples (including graded and non-graded milk) were collected at random in the town of Halle in Saxony and subjected to bacteriological and chemical tests. No tubercle bacilli were found. The majority of samples of graded milk gave a count of less than 10,000 bacteria per c.c. and the counts were somewhat lower than those of ungraded supplies, one of which had a count of over one million per c.c.

Of 12 samples of graded, pasteurized milk, one contained more than 600,000 bacteria per c.c. and of 45 ordinary pasteurized supplies, 5 contained more than one million bacteria per c.c.

Bact. coli was found in 48 out of 67 samples of raw milk and in 54 out of 57 samples of pasteurized milk. This high percentage of contamination was thought to be due to secondary infection in the dairy. The method of management adopted in the latter appeared to have some direct bearing upon the degree of cleanliness. A further series of tests for acidity, fat content and specific gravity was also carried out.

The difference between graded and ungraded milk supplies was not very striking, but on the whole it was considered that the control measures were proving effective.—N. S. Barron.

THERAPEUTICS.

Cernaianu, C., Gluhovschi, N., & Radef, J. (1935). Acaprin, ein neues Heilmittel für Piroplasmosen. [**" Acaprin " in the Treatment of Piroplasmosis**]. —*Z. InfektKr. Haustiere.* **48.** 185-195. 3 figs.

This article records the treatment of *Babesia caballi* infection in 75 horses by the intravenous administration of 4 to 5 c.c. doses of a 5 per cent. solution of " acaprin ". The temperatures dropped to normal within 24 hours of treatment and all the animals recovered. Twenty-six horses treated by the intramuscular injection of a similar dose of the drug also recovered ; treatment is also said to be successful if administered orally in doses of 2·5 to 3 g. given in the morning and

repeated at night. No relapses occurred in any of the animals. Fourteen cattle infected with *B. bovis* were successfully cured by the intravenous injection of " acaprin R " solution, and eight animals by the intramuscular injection of " acaprin ". Eight cattle infected with *B. bigemina* were also treated by an intravenous or intramuscular injection of " acaprin " in a dose of 6 c.c. of a 5 per cent. solution ; the results were satisfactory, but four animals treated in the last stages of the disease failed to respond.—U. F. Richardson.

Pottier, R., & van den Branden, F. (1935). Contribution à l'étude toxicologique de la glyphénarsine, pharmacopée belge IV. (Tryparsamide, tryponarsyl, novatoxyl, trypotan). [**Toxicological Study of Glyphenarsine (Tryparsamide, Tryponarsyl, Novatoxyl, Trypotan)**].—*Bull. Soc. Path. exot.* **28.** 726-731. 1 table. [5 refs.]

This article records further observations on the testing of samples of tryparsamide as to their toxicity, the authors maintaining that, in rabbits, a dose of 1 g. per kg. body weight should be the test dose for samples of this drug, and that if a smaller dose is used there is a risk that abnormally toxic preparations might be passed as suitable for use. Some preliminary experiments are recorded on the testing of the toxicity of various samples of tryparsamide on mice and rats. —U. F. Richardson.

Yakimoff, W. L., Gousseff, W. F., & Titkoff, A. D. (1935). Die Behandlung der Babesiosen und Francaiellose der Rinder mit Todorit. [**The Treatment of Bovine Babesiasis with " Todorit "**].—*Tierärztl. Rdsch.* **41.** 728-729. 1 table. [3 refs.]

The authors record the treatment of 27 cattle infected with *Babesia bovis*, and other nearly related piroplasms, by intramuscular injections of " todorit " given, in most cases, in a dose of 10 c.c. All the animals recovered except one which was slaughtered. Within 24 hours of the " todorit " injection, piroplasmal forms devoid of protoplasm were encountered, and a marked fall of temperature occurred. Complete recovery was effected in most cases within three days. —U. F. Richardson.

Kourí, P., Basnuevo, J. G., & Bacardí, J. F. (1935). Poder fasciolicida del clorhidrato de emetina. [**Emetine Hydrochloride in Fasciola Infestation**]. —*Med. Países cálidos.* **8.** 145-146. [3 refs.] [Copied *verbatim* from *Trop. Dis. Bull.* **32.** 628. Signed H. H. S.]

The authors are fully convinced of the power of emetine hydrochloride to destroy *Fasciola hepatica*. The average dose to attain this end they find is 3·72 mgm. per kilo body weight.

They mention the case of a woman of 38 years, weighing 43 kilos, who was cured by 16 cgm. and believe that smaller amounts would probably suffice. For an adult of 70 kilos 80 cgm. would be a toxic dose or 11·4 mgm. per kilo, so that the therapeutic coefficient would be about 0·3. Taking the average dose mentioned, a man of 70 kilos would need 260·4 mgm. to effect a cure, which is less than a third of the toxic dose, 800 mgm.

Kourí, P., Basnuevo, J. G., & Arenas, R. (1935). Una nueva aplicacion de la emetina en parasitologia. [**A New Use of " Emetine " in Parasitology**]. —*Arch. Med. infant.* **4.** 21-23. [4 refs.] [English version pp. 24-26]. [Copied *verbatim* from *Trop. Dis. Bull.* **32.** 628. Signed C. L.]

Six cases are cited in which emetine cured infection with *Fasciola hepatica*.

Schmidt-Hoensdorf, F. (1935). " Weidnerit-Gel " bei der Verhütung des Gelben Galtes. [**" Weidnerit-Gel " in the Prevention of Streptococcal Mastitis**].—*Berl. tierärztl. Wschr.* **51.** 643-644.

Schmidt-Hoensdorf had previously tested the efficacy of " weidnerit-gel " [see this *Bull.* **5.** 398.] and two other preparations recommended for lubricating the teats for milking. Disinfectant properties were claimed for all of these. A small quantity of each was mixed with mastitis secretion, the " weidnerit-gel " alone mixing easily. After five minutes each mixture was injected into a different quarter of a healthy cow, the fourth quarter being left as a control. This quarter and that injected with the " weidnerit-gel " remained healthy ; the other two quarters developed typical mastitis. Moreover, 34 days later, mastitis streptococci could still be cultivated from the preparations used in the case of these quarters.
—A. W. Stableforth.

Oesterlin, M., & Krainick, H. (1934). Orientierende Versuche zur Chemotherapie der Helminthen. [**Experiments on the Chemotherapy of Helminth Infestation**].—*Zlb. Bakt. I.* (*Orig.*). **132.** 222-228. 4 tables. [3 refs.]

Observations were made on the effect of 78 different organic substances in weak solution (1 : 50,000) on various internal helminth parasites, mostly *in vitro*. *Fasciola hepatica* was found to be sensitive to 3-amino-6-iodo-acridine, alkyl naphthol and especially to cresyl blue ; *in vivo*, however, this last mentioned substance was much less effective. The larvae of *Strongyloides stercoralis* were found to be affected by flavizid and rheonin A (acridine dyes) but gentian violet and triphenylmethane were less effective. *Opisthorchis felineus* responded to some extent to phenol derivatives, especially hexylresorcinol. Cresyl blue had some effect upon *Schistosoma mansoni in vitro* but showed no action *in vivo*. The cercariae were affected by acridine dyes, but not by antimony derivatives. The effect of acridine dyes was also tried on the microfilariae of *Loa loa*, flavizid and rheonin A being found to exert some action.—E. L. Taylor.

—. (1935). **A New Principle in Anthelmintic Medication.**—*J. Coun. sci. industr. Res. Aust.* **8.** 140.

In this note, attention is drawn to the work of Clunies Ross [see this *Bull.* **5.** 457.] and Ortlepp [(1935). *Fmg S. Afr.* **10.** 10], who have employed the principle that copper sulphate administered to sheep by the mouth causes closure of the oesophageal groove. The copper sulphate, and any drug administered soon afterwards, then passes directly to the fourth stomach, ensuring maximum efficiency in medication for stomach worm infestation. The possibility of using copper sulphate as a conveyor of more potent drugs is, therefore, suggested.—H. McL. G.

Mare, G. S., & de Villiers, O. T. (1935). **The Vermicidal Effects of Spineless Cactus** (*Opuntia* **sp.**). *J. S. Afr. vet. med. Ass.* **6.** 121-127. 8 tables. [4 refs.]

In an experiment on the feeding of sheep on cactus and lucerne hay ration for two years, it was observed that, incidentally, the sheep lost their intestinal nematode infections. As a result of further experiments the authors concluded that spineless cactus had no vermicidal effect but caused scouring which, in the absence of opportunities for reinfection, caused the disappearance of the parasites.
—E. M. Robinson.

I. Spence, A. W., & Scowen, E. F. (1935). **The Use of Gonadotropic Hormones in the Treatment of Imperfectly Migrated Testes.**—*Lancet.* **229.** 1335-1338. 3 tables. [Numerous refs.]

II. —. (1935). **The Undescended Testicle.**—*Ibid.* 1355-1356. [3 refs.]

I. Thirty-three human patients suffering from imperfectly migrated testes were treated with 500 rat units of " pregnyl " twice weekly and, in the majority of cases, successful results were obtained within periods varying between two weeks and four and a half months.

II. The descent of the testes into the scrotum of the normal foetus is probably due to the action of the gonadotropic hormones circulating in the maternal blood stream. If the testes have not reached the scrotum at the time of birth when this influence is cut off, they remain in the inguinal canal until an increased supply of gonadotropic hormone is again forthcoming. This usually occurs at puberty or at the time of rut. Lack of gonadotropic hormone may not be the only cause of undescended testes, since it is now known that oestrin inhibits their descent.

Histological examinations of undescended testes have shown that the seminal epithelium undergoes degeneration, but that the interstitial tissue remains functional. When the testes are returned to the scrotum the seminal epithelium regenerates and fertility is restored [see also this *Bull.* **6.** 178].—J. A. Nicholson.

Glud, P. (1935). Sterilitet hos hoppen forsøgsvis behandlet med serum fra draegtige hopper samt med et hormonpraeparat fremstillet af disses urin. **[Treatment of Sterility in Mares with Serum of Pregnant Mares and with a Hormone Preparation made from Urine of Pregnant Mares].**—*Maanedsskr. Dyrl.* **47.** 33-47. 4 figs. [11 refs.]

After a review of sexual hormones and their use in veterinary medicine in diagnosis and treatment, the author gives 14 case records of mares showing evidence of sub-function of the ovaries, ovarian cysts or persistent corpus luteum. They were variously treated once or twice with serum containing 1,500 to 3,000 mouse units of gonadotropic hormone from mares in foal, and/or with commercial preparations of prolan and folliculin, the latter having been obtained from urine. In every case oestrum occurred in two to 15 days after treatment and seven of the mares were reported later as being in foal.—H. C. Bendixen (Copenhagen).

Benesch, F., & Kostner, M. (1935). Der Einfluss der Hypophysenvorderlappen- und Ovarialhormone auf den Genitalapparat der Hündin zur Bekämpfung der Unfruchtbarkeit. **[Influence of Anterior Pituitary and Ovarian Hormone on the Genital System of the Bitch with Regard to Control of Sterility].**—*Münch. tierärztl. Wschr.* **86.** 553-557 and 566-571. 2 figs. [20 refs.]

Bitches suffering from sterility due to hormonal dysfunction may be divided into four groups. In the first group, signs of oestrum are absent due to hypoplastic juvenile sexual organs. Treatment with oestrin followed by prolan often corrects the condition. In the second group, although the sexual cycle is apparently normal, the animals remain barren. Prolan alone is usually sufficient to induce pregnancy but, as in the first group, previous treatment with oestrin to prepare the uterus for the reception of the ovum is more likely to bring about the desired effect. In the third group, signs of oestrum are weak due to the fact that the ovaries only contain a few small follicles. Treatment with prolan is usually followed by the onset of oestrum. In the fourth group, the oestrous cycle is abnormally long. Here rupture of the follicles has been delayed and all the follicles have not ruptured at the same time. These cases usually yield to injections of prolan followed by progestin. If treatment is delayed, however, hyperplasia of the endometrium takes

place and the continued proliferation of the uterine mucous membrane leads to pyometra, and bacteria may enter through the cervical canal.

In order to induce one complete sexual cycle in the bitch, 500 to 1,000 mouse units of prolan, 20,000 to 60,000 M.U. of oestrin and 1 to 2 rabbit units of progestin are required. The size of the dose to be given at one time varies considerably between individuals, but seems to be calculable from the weight of the animal. The doses used in this work varied between 50 to 500 M.U. of prolan and 500 to 10,000 M.U. of oestrin.—J. A. Nicholson.

Benesch, F., & Kostner, M. (1935). Erfahrungen über den Hypophysenextrakt als Wehenmittel bei den Fleischfressern mit besonderer Berücksichtigung des Orasthins. [**The Use of Pituitary Extract as an Ecbolic with Special Reference to " Orasthin "**].—*Münch. tierärztl. Wschr.* **86.** 421-424. 1 table.

A summary of four years' experience in obstetrical aid on hundreds of dogs and cats for which pituitary extract was given as an ecbolic. Most preparations used contain whole extract of the posterior pituitary gland, but " orasthin " contains only the utero-stimulant principle of the posterior pituitary.

" Orasthin " is more powerful in action than whole posterior pituitary extract and cases which do not respond to the latter often respond quickly to " orasthin ".—J. E.

Domagk, G. (1935). Eine neue Klasse von Desinfektionsmitteln. [**A New Class of Chemical Disinfectants**].—*Dtsch. med. Wschr.* **61.** 829-832.

" Zephirol " is an aqueous solution of an alkyl-dimethyl-benzyl-ammonium-chloride. It has high disinfecting power and its aqueous solutions are colourless and odourless. In common with most other disinfectants, its disinfecting power is slightly reduced in media containing protein.—G. D. Shearer.

Garrod, L. P. (1935). **The Effect of Bacterial Numbers on Minimum Bacteriostatic Concentrations.**—*J. infect. Dis.* **57.** 247-251. 2 tables. [12 refs.]

The inhibitory effect of minimum concentrations of phenyl-mercuric nitrate and phenol in broth varies with the number of organisms inoculated, in this case *Staphylococcus aureus*. When the inoculum consisted of very few organisms, growth was inhibited by very high dilutions of disinfectant and *vice versa*, but very small numbers of organisms inoculated with control broth often showed no growth. Standardization of methods for the study of bacteriostatic action is urged.

—A. W. Taylor.

POISONS AND POISONING.

Torrey, J. P., & Graham, R. (1935). **A Note on Experimental Salt Poisoning in Ducks.**—*Cornell Vet.* **25.** 50-53. [12 refs.]

This is a record of further experiments to elucidate the cause of mortality among wild ducks along the Illinois river. In a previous communication [see this *Bull.* **5.** 447.] the authors attributed the cause to poisoning by lead shot found in the bulboventriculus. It was suggested, however, that common salt might be the cause of death.

Four Pekin ducks, six weeks old, were used for an experiment, with two acting as controls. The experimental ducks received 1, 2, 4 and 6 g. of NaCl daily, instilled in aqueous solution into the proventriculus. Those receiving

1 and 2 g. daily showed no ill effects after 29 days on the experimental diet and gained in weight. The other two, receiving 4 and 6 g. daily, succumbed on the fourth day of dosage. They appeared quite healthy before dosing, but soon appeared drowsy, were unable to stand and died. No marked pathological changes were observed on *post-mortem* examination. No ill effects were produced in ducks fed with corn soaked in sodium chloride for two weeks. It was found that corn absorbed very little salt when soaked or boiled in a salt solution. [Botulism of wild ducks has also been described – this *Bull.* **5.** 798].—G. D. Shearer.

Sampson, A. W., & Malmsten, H. E. (1935). **Stock-Poisoning Plants of California.**—*Bull. Calif. agric. Exp. Sta.* No. 593. pp. 90. 20 figs., 3 plates, 2 tables. [Numerous refs.]

A general dissertation on plant poisoning, with special accounts of some 30 common poisonous plants, or groups of plants, of California.

The bulletin has been very well prepared; many plants are illustrated in colour and others in line drawings.—J. E.

Pichon, & Baïssas. (1935). L'intoxication par les prêles chez les bovidés. [*Equisetum* **Poisoning in Cattle**].—*Rec. Méd. vét.* **111.** 587-592.

Three outbreaks of poisoning in cattle, by the ingestion of *E. palustre* in hay, are described. No deaths occurred and all the animals recovered when the incriminated hay was removed. The symptoms observed were diminution of milk secretion, inappetence, cessation of rumination and occasional haemoglobinuria.—G. D. Shearer.

Nicolas, E., Tapernoux, A., & Vuillaume, R. (1935). Contribution à l'étude toxicologique des torteaux de lin cyanogénétiques. [**Linseed Cake Poisoning**].—*Rev. vét., Toulouse.* **87.** 441-467. 1 fig., 3 tables. [22 refs.]

The poisonous properties of linseed cake are due to the presence of the cyanogenetic glucoside linimarin and the enzyme linase which splits off HCN from the glucoside. Poisoning only takes place when the glucoside absorbed with the cake splits off more than the minimum lethal dose of HCN for the animal concerned. Administration of the cake as a mash which has been prepared for some time or the giving of large amounts of linseed cake at one meal are the principal causes of poisoning.—G. D. Shearer.

Tillyard, R. J. (1934). **The Entomological Control of Noxious Weeds in the Pacific Region.**—*Proc. 5th Pacif. Sci. Congr. Can. 1933.* pp. 3547-3557. [6 refs.]

In the entomological control of noxious weeds, the most important discovery has been the remarkable success of the caterpillars of the moth, *Cactoblastus cactorum*, in controlling prickly pear and, more particularly, the common pest pear, *Opuntia inermis*. It has been estimated that 80 per cent. of the prickly pear in Queensland, and 60 per cent. in New South Wales, has been cleared by this insect. The infested area totalled about 60 million acres. The effect produced by *Cactoblastus* is due to its association with a soft-rot bacillus.

The cinnabar moth, *Tyria jacobaeae*, has been liberated in New Zealand in an attempt to control ragwort, *Senecio jacobaea*, but it does not appear probable that control of this plant will be effected by this method.

Tests against St. John's wort, *Hypericum*, with moths of the genus *Anaitis*, are so far satisfactory in the insectary.—J. S. Steward.

PHYSIOLOGY.

EVELETH, D. F., & EVELETH, Margaret W. (1935). **Blood Chemistry of Swine. II. Further Studies of Blood Changes following the Ingestion of Glucose.** —*J. biol. Chem.* **111.** 753-756. 1 table. [11 refs.] [For abst. of previous article, see this *Bull.* **4.** 587].

The experiments were carried out on five pigs with the object of observing if the oral administration of glucose solution would change the Ca, Mg, inorganic P and oxalic acid content of the blood. The dose of the glucose varied from 166 to 290 g. per animal. Control observations were made by the administration of equivalent volumes of water. Three samples of blood were withdrawn at half-hourly intervals after the administration. There was a decrease in all the above constituents after the ingestion of water. Following the glucose ingestion, the concentration of the inorganic P and the Ca was decreased, and that of the Mg and oxalic acid was increased.—HENRY DRYERRE.

MORGAN, V. E., & CHICHESTER, D. F. (1935). **Properties of the Blood of the Domestic Fowl.**—*J. biol. Chem.* **110.** 285-298. 4 figs., 2 tables. [18 refs.]

A physico-chemical examination of a composite mixture of blood from a group of Rhode Island Red fowls was carried out and the results compared with the findings obtained with blood from the dog and man. The temperature was maintained at 40°C. throughout the manipulations and blood samples from individual birds were never examined. A comparison between the composition of cells and serum in the chicken, man and dog showed that in the former the value for serum protein is low whereas the cell haemoglobin is only slightly lower than in the other two species. The values for sodium and potassium in the fowl are nearer to those for man but the phosphate more nearly resembles that of the dog. The buffering values of fowl serum proteins and cells are practically the same as for man if their relative concentrations are taken into account. A study of the oxygen dissociation curves shows that in fowls they are displaced to the right as compared with normal curves for man ; this probably indicates that fowl haemoglobin has a definitely smaller affinity for oxygen than that of man. The tissues of fowls, however, possess a very high utilization power of oxygen. The average red cell count in the fowl was found to be 2·94 million per c.mm. of blood.
—J. A. NICHOLSON.

I. KENNEDY, A. H. (1933). **Studies on the Normal Blood of Foxes.**—*Bull. Ont. Dep. Game.* No. 6. pp. 47. 18 figs., 29 tables. [Numerous refs.]

II. KENNEDY, A. H. (1935). **A Graphical Study of the Blood of Normal Foxes.** —*Canad. J. Res.* **12.** 796-802. 9 figs., 2 tables. [1 ref.]

I. The author presents graphs of the various cellular elements of normal fox blood from data obtained from a number of foxes of various ages, and shows the minimum, mean and maximum numbers of the blood elements occurring in both males and females according to age group. The original must be consulted for the results arrived at, but it may be said in a general way that the red blood cell count averages 5,000,000 per c.mm. at one month, rises to about 9,000,000 at 4 to 6 months and thereafter remains more or less constant. The white blood cell count is about 7,300 per c.mm. at one month, rises to 11,000 at 3 to 4 months and thereafter fluctuates considerably.

According to the author, the eosinophile is not found in fox blood, but is replaced by a cell which is distinctly basophilic in staining reaction and which he classes as a basophile.

II. An abbreviated version of I.—C. V. WATKINS.

NAVEZ, O. (1935). Le système lymphatique des oiseaux domestiques. Aperçu sur leurs principaux vaisseaux sanguins, leur thymus, leurs corps thyroïdes et leurs parathyroïdes. **[Lymphatic System of Birds].**—*Ann. Méd. vét.* **80.** 403-424. [5 refs.]

This is an anatomical description of the lymphatic system of domestic birds, together with a description of the principal blood vessels, thymus, thyroid and parathyroid glands. Instructions are also given for the dissection of birds in order that the above structures may be found. The following important facts are included in this paper :–

(1) Lymphatic glands do not occur in fowl, turkeys and pigeons.

(2) In the duck, goose and swan, lymphatic glands are usually present at the entrance to the thorax and in the sublumbar region. They may be absent. Structurally they are simpler than mammalian lymphatic glands.

(3) It is important that the thymus, thyroid and parathyroid glands should not be taken for lymphatic glands, a mistake which the author states is sometimes made in publications.—GWILYM O. DAVIES.

BURNS, Clarice M., & HENDERSON, Nellie. (1935). **The Mineral Constituents of Bone. I. Methods of Analysis.**—*Biochem. J.* **29.** 2385-2395. [16 refs.]

Methods are described for the analysis in bone of calcium and phosphorus with an accuracy of $\pm 1{\cdot}5$ per cent. and of carbonate with a ± 3 per cent. error. Using a method for bone phosphate involving the filtering of a precipitate produced by ammonium molybdate, low results were obtained. Analyses were made of bone samples directly, and after extraction of the organic matter with alkaline glycerol, but this extraction involved some loss of phosphate, generally small, giving higher calcium : phosphorus ratios.

Analysis of 270 samples of bones from various species indicated the probable presence of a phosphate other than tricalcium phosphate or magnesium phosphate. —ALFRED EDEN.

LANGDON-BROWN, W. (1935). **Integration of the Endocrine System.**—*Lancet.* **229.** 1155-1161. [30 refs.]

The endocrine organs steadily function in response to the basic biochemical requirements of the body. Their activity, however, is controlled by stimulating and inhibiting secretions formed in the anterior lobe of the pituitary. This is in turn affected by nervous impulses from the site of emotional expression – the diencephalon.—HENRY DRYERRE.

CATCHPOLE, H. R., COLE, H. H., & PEARSON, P. B. (1935). **Studies on the Rate of Disappearance and Fate of Mare Gonadotropic Hormone following Intravenous Injection.**—*Amer. J. Physiol.* **112.** 21-26. 2 figs. [7 refs.]

The rate of disappearance of pregnant mare hormone was determined by injecting massive doses of serum containing the hormone into intact and castrated female rabbits, and then withdrawing blood samples at intervals and examining these for the presence of the hormone by Cole's method. It was found that in both types of experimental animal the hormonal concentration in the blood was reduced by about one half every 26 hours. The experiments were repeated on a gelding and in this case reduction by one half took place every six days. No evidence was obtained that the hormone is excreted in the urine or faeces or is stored in any organ ; presumably it is destroyed in the body. This indicates that gonadotropic hormone of mares differs from prolan of women, since the latter is freely excreted in the urine.—J. A. NICHOLSON.

LENKEIT, W., & COLUMBUS, A. (1935). Untersuchungen über den Flüssigkeitstransport beim Wiederkäuer. [**The Passage of Liquids through the Ruminant Stomach**].—*Arch. wiss. prakt. Tierheilk.* **69.** 380-386. 4 tables. [13 refs.]

The function of the oesophageal groove in lambs was studied by administering a single dose of potassium iodide in water or milk and later examining the ruminal contents and urine, at intervals, for the presence of iodine. The presence of iodine in the urine gave evidence that the KI had passed through the abomasum. In this way, the rate of passage of ingesta from the rumen to the abomasum could be roughly determined.

In all cases, KI was no longer found in the rumen after four days, nor in the urine after seven days. Hunger retarded the passage of the KI from the rumen.

This work supports the views already formed as the result of other forms of research on the physiology of rumination [see this *Bull.* **4.** 390, and **5.** 300].—J. E.

I. LINTON, R. G. (1935). **Canine Nutrition.**—*12th Int. vet. Congr. 1934.* **3.** 488-502. 4 tables. [Numerous refs.] [French, German and Spanish summaries].

II. STANG, V. (1935). Wissenschaftliche Grundsätze der Fütterung. [**Scientific Basis of Nutrition**].—*Ibid.* 503-520. [English, French and Spanish summaries : abst. from orig. in German].

I. The nutrition of the dog has so far escaped much attention by research workers, and both veterinary surgeons and dog breeders hold the most divergent views concerning the quantity and quality of the ideal ration. This can be understood in view of the variety of breeds and the different conditions under which dogs exist and the consequent difficulty in finding a common basis on which to set up standards. The author maintains that the Deschambrés standards, based upon live weight, for the food requirements of dogs may be accepted as a useful guide as to the quantity and proportions of protein, fat and carbohydrate necessary. The popularity of dog biscuits as the chief food of many dogs and also the fact that they have been blamed for causing hysteria made it desirable to investigate their manufacture and composition thoroughly ; not the least valuable feature of the present paper is the table showing the analysis of 27 varieties. The large variation shown in composition makes it essential that before utilizing dog biscuits in the ration their composition must be fully known otherwise the protein, fat and carbohydrate standards might be considerably upset. The author stresses the need of raw flesh and of vitamins A, B_1, B_2, D and E in the diet of the dog but points out that the use of vegetables either raw or cooked is probably unnecessary.

II. This paper is for the most part a plea by the author for more attention to be paid to the wholesomeness of the foodstuffs comprising the diet of animals. He concludes that the determination of the nutritive value of a ration based on the starch equivalent method of KELLNER or the net energy values of ARMSBY or their modifications by Nils HANSSON and MOLLGÄARD is not sufficient for the maintenance of a high standard of health especially in the light of mineral and vitamin deficiency diseases, of which a short account is given. [Stock-owners in this country have already paid attention to this point by the general use of mineral supplements and vitamin-rich foodstuffs].—JAMES STEWART.

COWDRY, E. V., LUCAS, A. M., & NEFF, C. F. (1935). **Resistance of Vitamin B_1 and B_2 Deficient and Normal Rats to Intracerebral Injection of Herpes Virus.**—*J. infect. Dis.* **57.** 174-182. 1 fig., 8 tables. [10 refs.]

Fully 100 rats were fed on a diet deficient in vitamins B_1 and B_2 and compared

with a similar number of rats fed on normal rations. There was not sufficient evidence to show that the deficiency of the vitamins reduced the resistance to herpes.—Henry Dryerre.

Haldane, J. B. S. (1935). Contribution de la génétique à la solution de quelques problèmes physiologiques. [**The Use of Genetics in the Solution of Physiological Problems**].—*C. R. Soc. Biol. Paris.* **119.** 1481-1496. [6 refs.]

The function of genes in cellular life forms the main subject of this paper and certain physiological phenomena in plant and animal life are explained by a reference to the behaviour of the genes. It is pointed out that not only the final effects, but also the primary action, of genes must be studied in order to understand their physiological significance. It has been shown that the majority of genes which produce abnormal characters, such as malformation of the eyes and feet in mice or fragility of the red blood corpuscles, are recessive. Recessive genes, however, only differ from normal genes by acting with diminished force.

Genes are responsible for the determination of many chemical processes which occur in plants and animals as, for example, the elaboration of certain glucosides or the high percentage of uric acid excreted in the urine of Dalmatian dogs. This latter phenomenon has been proved to be a recessive character. Genes, therefore, determine elementary functions or elementary chemical reactions which may end in the development of a certain character, and their study offers a means of discovering the intermediate metabolism of many substances of physiological importance in plant and animal life.—J. A. Nicholson.

TECHNIQUE.

Carpentier, G. (1935). Le diagnostic par la microscopie fécale, en clientèle et au régiment. [**Diagnosis of Disease by Microscopic Examination of the Faeces**].—*Rec. Méd. vét.* **111.** 723-758. 32 figs. [1 ref.]

This paper is an addition to the several which have appeared on the technique for the examination of faeces for evidence of helminthic infestation and helminthic disease. In it Carpentier gives a detailed account of some simple methods of his own and considers it advantageous to concentrate the eggs, either by screening and centrifuging, or by floating in saturated salt solution or in syrup. He describes the technique of using the microscope for the examination and deals with the most suitable magnifications, the measurement of the eggs and larvae and the interpretation of results. In this last-mentioned section, attention is drawn to the desirability of getting some idea of the numbers of eggs present, and he speaks of units, tens and hundreds per preparation as a guide to the examiner. The latter part of the paper deals with a description of the commoner eggs, arranged according to host, and 32 diagrams appear at the end, unfortunately drawn to different scales, of the eggs of parasitic worms found in the faeces of domestic animals.—E. L. T.

Pijper, A. (1935). **The Zeiss " Pijper Blood-Cell Tester ".**—*S. Afr. med. J.* **9.** 205-208. 4 figs., 1 table. [5 refs.]

This article describes an apparatus for the investigation of certain properties of blood cells such as the mean diameter and variation in shape of red blood cells. The apparatus applies the measurement of diffraction as previously described by Pijper [this *Bull.* **3.** 275]. The value of the diffraction method of measuring red corpuscles is its accuracy and rapidity of determinations, upwards of a million cells being measured, and the elimination of the personal factor. The construction

of the apparatus and its value in the diagnosis of various forms of anaemia are described.—E. M. Robinson.

Cuboni, E. (1935). Una rapida reazione di gravidanza nella cavalla. Nota seconda. [**A Chemical Test for Pregnancy in the Mare. Part 2**].—*Clin. vet., Milano.* **58.** 713-726. 1 fig. [4 refs.] [German summary : abst. from orig.] [For abst. of previous article, see this *Bull.* **4.** 782].

The value of a chemical test for the diagnosis of pregnancy in mares has been determined. 3 c.c. of concentrated hydrochloric acid is added to 15 c.c. of filtered urine and the mixture placed in a boiling water-bath for 10 minutes, cooled and extracted with 18 c.c. of benzene. The extract is then transferred to another flask and 10 c.c. of concentrated sulphuric acid added ; 5 to 15 minutes later the sulphuric acid is separated off, placed for 5 minutes in a water-bath at 80°C. and cooled. If the reaction is negative, the sulphuric acid is port-wine coloured ; if positive, when looked at by means of incident light, it shows a fluorescent green colour. This indicates the presence of oestrin. The readings should be made immediately after the acid has been removed from the water-bath and both positive and negative controls should be examined at the same time.

Samples of urine from 110 non-pregnant mares, 45 geldings and 60 pregnant mares were subjected to the test. Positive results were obtained only with urine which contained 350 to 400 mouse units of oestrin. Negative results were obtained 24 to 48 hours after parturition. Concentrated hydrochloric or nitric acid is unsuitable for the final stages of the test.—J. A. Nicholson.

Zeetti, R. (1935). Nouvelle méthode pour colorer facilement les spores des schizomycètes. [**A New Staining Method for Schizomycetes**].—*Boll. Sez. ital. Soc. int. Microbiol.* **7.** 310-311. [In French].

A new staining method for bacterial spores. Solution A.—Lugol solution 100 c.c., eosin (water soluble) 5 g., carbolic acid cryst. 5 g. Filter the solution through paper. Solution B.—Dilute solution of methylene blue : one part of sat. alc. sol. in 15 to 20 parts of water. Method.—Prepare and fix films in the usual way. Stain with solution A, using heat, for five minutes. Boil two or three times. Wash with distilled water and stain with solution B for one and a half to two minutes. Wash with water and dry in the air.—Gwilym O. Davies.

MISCELLANEOUS.

Lundgren, H. P. (1935). **Chemical Relationships between Compounds of Physiological Importance having the Phenanthrene Nucleus.**—*Science.* **82.** 130-133. 1 fig.

As biochemical research progresses it is becoming very evident that an interesting chemical relationship exists between many biological substances of very diverse physiological action. Ergosterol, vitamin D, male and female sex hormones, the carcinogenic compounds in coal-tar, the alkaloids, morphine and codeine, heart stimulants such as digitalis aglucones, and even bufotalin, a toad poison, all belong to the condensed ring system having the sterol structure as nucleus.—James Stewart.

Mohler, J. R. (1935). **Relationship of Veterinary Science to Animal Breeding and Public Health. Legal Protection of the Practice of Veterinary Science.** —*12th Int. vet. Congr. 1934.* **1.** 171-188. [French, German and Spanish summaries].

This paper deals with animal breeding, public health and legal protection of veterinary practice. The Bureau of Animal Industry of the United States of America co-operates with veterinary practitioners in the eradication of animal diseases and endeavours to prevent the use of quack remedies. Veterinary inspection in connexion with meat, milk and eggs provides a public health safeguard in preventing the spread of animal diseases to man.

Veterinary science in the U.S.A. has proved an important help in the advancement of public health in that country, and this has been materially aided by the legal enactments protecting the veterinary profession. The laws passed in connexion with meat inspection for home and export consumption created a further demand for veterinary inspectors. The progress of veterinary science and the extension of its scientific usefulness to the community are materially helped by the legal protection extended to it by the authorities of the U.S.A.—B. DeVine.

Leclainche, E. (1935). Une police sanitaire moderne. **[A Modern Veterinary Police System].**—*12th Int. vet. Congr. 1934.* **1.** 161-170. [English, German and Spanish summaries : abst. from orig. in French]. [Also appeared in *Rev. gén. Méd. vét.* **43.** 449-458.]

The classical system (of slaughter or isolation of affected animals and disinfection of premises, supplemented in more recent years by immunization methods), although satisfactory for some diseases, has proved inadequate when applied to others. New situations are arising, particularly as a result of modern developments of commerce and transport, leading to wide dissemination of diseases previously localized, and drastic methods sometimes become too onerous both for the individual and the state.

A " new system " now described would not supplant the old methods ; it would be superimposed on them. Its aim would be to seek out herds free from the dangerous contagious diseases, to award them " State Certificates of Health " and to turn them to account by building up from them reservoirs of healthy stock for replacements of infected herds.—E. Brown.

Leclainche, E. (1935). La médecine vétérinaire en Espagne. **[Veterinary Medicine in Spain].**—*Rev. gén. Méd. vét.* **44.** 630-634.

The first Spanish veterinary school was founded in 1793, but all the work was nullified in 1813 when the practice of all professions was thrown open to everybody. A veterinary association was founded early in the present century and started in 1911 to publish the periodical *Revista de Higiene y Sanidad pecuarias.* In 1923 there were 3,000 members who, after the revolution of 1931, were able to form the " Direccion general de Ganaderia " [this *Bull.* **2.** 678.] as a government sub-department. Recently, however, this has been abolished.

Veterinary education is now entrusted to four colleges, at Madrid, Leon, Saragossa and Cordova, the last-named alone being new. The course of instruction for " licenciate in veterinary and zoo-technical science " now lasts for three years. Veterinary affairs as a whole are, however, in a very bad condition.

One other establishment, the Institute of Animal Biology at Madrid, came into existence in 1932 and carries out investigations into animal physiology and diseases.—J. E.

Jaime Castro, H. (1935). Diccionario etimologico de parasitologia. **[Etymological Dictionary of Parasitology].**—*Rev. Med. vet. Bogotá.* **6.** Nos. 62 and 63. pp. 1-61.

This special double number is entirely devoted to an alphabetical dictionary of generic and special names of bacteria, fungi, protozoa, arthropoda and worms parasitic in domestic animals. The bulk of the definitions are concerned with etymology.—J. E.

DUDLEY, S. F. (1935). **On the Biological Approach to the Study of Epidemiology.** —*Proc. R. Soc. Med.* **29.** 1-14. [Numerous refs.]

" Epidemics, being the visible reaction of herds to certain types of parasitic infection, are essentially biological phenomena." From this initial statement and a reference to the importance in epidemiology of the observation and comparison of sequences of events in the field as essential complements of laboratory experiments, the author passes to a vividly informative discussion of the variability of host resistance and parasitic variations, especially bacterial mutations, both stable and transitory. There follows a consideration of the struggle of existence and the interrelationship of the host, its parasites, its inorganic environment and the other living organisms which inhabit that environment. All living things can adjust themselves to change and in untouched nature equilibrium is relatively stable. Man's constant interference with his own environment [and that of his domestic animals] is perhaps the chief reason for his [and their] special predilection to gross disease and epidemics.—E. BROWN.

REIBEL, G. (1935). Nouveau système pour relever l'impression des marques à feu sur le gros bétail. [**A New Method for the Identification of Branding Marks on Cattle**].—*Bull. Acad. vét. Fr.* **8.** 402-404.

The author describes a system, analogous to the human fingerprint method, for taking permanent impressions of branding marks on livestock. He has found the method to be very helpful in settling disputes as to the ownership of animals. —J. E.

BROWN, E. G., GOTTLIEB, Selma, & LAYBOURN, R. L. (1935). **Dust Storms and their Possible Effect on Health. With Special Reference to the Dust Storms in Kansas in 1935.**—*Publ. Hlth Rep., Wash.* **50.** 1369-1383. 2 text figs., 13 figs. on 8 plates, 5 tables. [17 refs.]

An account is given of the dust storms which occurred in Kansas in 1935 as the result of a four-year period of decreased rainfall, a lack of growth of vegetation, and high winds. The authors made examinations of the dust and found that it had a very high silica content and that its flora consisted chiefly of sporulating anaerobes, moulds and yeasts ; no pathogenic organisms were detected. An increase in the human mortality from respiratory diseases followed the storms ; this was attributed to the irritant action of the dust. It is also recorded that there was a great loss of livestock, but no particulars are given as to the exact cause of the losses.—F. BLAKEMORE.

OFFICIAL AND OTHER REPORTS.

UNITED STATES OF AMERICA. (1934). **Report of the Chief of the Bureau of Animal Industry, 1934.** [MOHLER, J. R.] pp. 52. 26 tables. Washington, D.C. : U.S. Govt. Printing Off. [8vo] [5 cents].

During the year the staff of the bureau, in addition to its usual duties, performed special duties in connexion with agricultural adjustment and drought relief. These functions comprised a marked increase of interstate inspections of

animals shipped from drought areas to regions where pasture was adequate, and also augmented the number of meat inspections due to expansion of disease eradication schemes and slaughter of livestock shipped from drought areas. Approximately one million cattle were shipped from the drought areas to the southern pastures, a feat which would not have been possible if the pastures had not been freed from ticks. Out of the 15 states formerly affected with cattle ticks, only Florida, Louisiana and Texas remain. During the year 13,208 square miles were released and no new areas were requarantined.

ANIMAL HUSBANDRY DIVISION. [SHEETS, E. W.]

Data are given of an investigation of close inbreeding in swine. Performance studies emphasize anew the importance of basing the selection of breeding animals on the satisfactory performance of their progeny.

A study was made to find out the effect of equal milking intervals of 12 hours against the unequal intervals of 8 and 16 hours. This showed that the 12-hour intervals give a higher milk yield and also a better percentage of butter fat.

Research into poultry breeding, hatchability of eggs and feeding was carried out. A study of vitamin D requirements of laying hens showed the optimum level of cod liver oil in the diet to be between 1 and 2 per cent. When 4 per cent. or more was given there was a decrease in egg production as well as in the hatchability of fertile eggs set.

BIOCHEMICAL DIVISION. [DORSET, M.]

SWINE FEVER INVESTIGATIONS.—Experiments showed that the " clear virus " [serum treated according to a prescribed method to remove cellular elements – see *Circ. U.S. Dep. Agric.* No. 11. (1927).] could be used effectively to produce immunity by the serum-simultaneous method. Work is being continued to ascertain the value of glycerin and phenylmercuric acetate as preservatives for swine fever serum and virus. To reduce the cost of immunizing swine, an investigation is being made into vaccines.

DISINFECTANTS.—Results show that the laboratory tests such as are used in determining the phenol co-efficient are not reliable guides to the effects of disinfectants under practical conditions.

EXPERIMENT STATION. [COTTON, W. E.]

Brucella abortus INFECTION.—In an experiment it was proved that cattle have considerable resistance to the porcine strain. The co-operative control schemes begun in 1929 were still in progress.

TUBERCULOSIS ERADICATION.—Studies in the so-called " skin lesion tuberculosis " were continued. Four cattle were inoculated subcutaneously with apparently identical strains of acid-fast organisms obtained from " skin lesion " cases ; all four developed swellings at the site in two to three weeks. None showed a sensitization to mammalian tuberculin but all were positive to avian tuberculin at the end of three months.

VESICULAR STOMATITIS.—Work on two strains of vesicular stomatitis virus is recorded and an apparently new vesicular disease in garbage-fed swine in California, believed to be caused by a filtrable virus, is described.

FIELD INSPECTION DIVISION. [POPE, G. W.]

MANGE.—The eradication of sheep scab continued, the total number of sheep in flocks in which infection was found numbering 78,000. Cattle mange is now confined to four states and dipping campaigns are in operation. Mange is still present in goats in Texas to a small extent. This division is also concerned with prevention of entry into the country of contagious animal diseases.

MEAT INSPECTION DIVISION. [STEDDOM, R. P.]

Statistics on disease conditions found in the state abattoirs are given. 77,500,000 animals were slaughtered under inspection in 741 establishments.

PACKERS AND STOCKYARDS DIVISION. [MILLER, A. W.]

This section deals with the operation of stockyards under the laws regulating their work.

PATHOLOGICAL DIVISION. [SCHOENING, H. W.]

No cases of glanders or dourine occurred. One case of rabies was diagnosed.

RESEARCH DIVISION.—A report is given on the progress made in research into bovine mastitis, swine erysipelas, anthrax immunizing agents, the porcine strain of *Br. abortus*, the value of bicarbonate of soda as a preventive against shipping fever, equine encephalomyelitis and ringworm in cats. Details are given of the work undertaken in co-operation with the Zoological Division on the application of the complement-fixation tests in the diagnosis of anaplasmosis.

A list of plants, etc., tested for poisonous properties is also given. From research into " big head " of sheep it is inferred that it is a type of plant poisoning, *Tetradymia glabrata* and *T. canescens* being implicated in many cases. " Big head " is not essentially a condition of photosensitization.

DIVISION OF TICK ERADICATION AND SPECIAL DISEASES. [MACKELLAR, W. M.]

This was formed in June, 1934 by the consolidation of the Divisions of Tick Eradication and Hog Cholera Control.

Tick eradication was further extended and the " cattle tick " (*Boophilus annulatus*) is now confined to parts of Florida, Louisiana and Texas.

Thirty Bureau veterinarians were engaged in swine fever eradication and 4,000 outbreaks were reported during the year. A large part of the work is educational.

TUBERCULOSIS ERADICATION DIVISION. [WIGHT, W. E.]

A survey conducted in the spring of 1934 revealed the approximate degree of bovine tuberculosis for the entire country to be 1·1 per cent. against 4 per cent. at the first survey in 1922. More than two-thirds of all the counties in the various states have either eradicated tuberculosis or are actively engaged in doing so. During the year 15,119,763 tuberculin tests were carried out on cattle. The percentage of reactors was 1·5 against 2 in 1933. 4,314,614 herds were under supervision at the end of the year. From 1917 to 1924, 2,925,938 reactors were removed from the herds of the nation. Fourteen states are now declared modified accredited areas.

Tuberculosis was found in 3,468 flocks of poultry out of 149,915 situated in 21 states. A considerable number of swine were found to be affected with avian tuberculosis.

According to tests with avian tuberculin and johnin, Johne's disease exists to a slight degree in 11 states. Johnin is stated to be a satisfactory diagnostic agent.

DIVISION OF VIRUS-SERUM CONTROL. [SKIDMORE, D. I.]

This division supervises the commercial production of biological products for use against animal disease and a list of doses manufactured is given, 83 establishments being licensed for the purpose.

ZOOLOGICAL DIVISION. [HALL, M. C.]

Important research into anaplasmosis and the possible tick vectors is recorded. In this connexion it is stated that blood groups may be important when blood

inoculations are made, and that reactions to such inoculations may be due to the blood group factor and be unrelated to the pathogenic micro-organism it contains.

An area in Colorado has been used in the experimental treatment of ox warble flies in cattle, mechanical extraction and the use of medicated rods for insertion into the warble opening being used with moderate success.

Nasal granuloma of cattle in Louisiana was found not to be due to animal parasites.

Stephanofilariasis of the skin of cattle is being studied.

Research on protozoan and helminth parasites in domestic animals is recorded. Information on " fouadin " treatment against heartworm infestation in dogs and methyl chloroform against ascarids and hookworms of dogs is also given.—G. D. M.

FRANCE. (1935). Rapport sur les opérations du service vétérinaire sanitaire de Paris et du département de la Seine. **[Report of the Veterinary Service, Paris, for the Year 1934].** [CHRÉTIEN, A.] pp. 165. 56 tables, 5 graphs. Paris : Imprimerie Chaix. [4to].

This report is divided into four sections.

(1) This part deals with sanitary police measures against contagious diseases of animals. Four cases of rabies in dogs were diagnosed in the area and full statistics are given. Nine herds were infected with foot and mouth disease and 7,142 cases were detected in the abattoirs between January 1st and April 12th, none afterwards. No cases of notifiable tuberculosis, or of glanders, anthrax, or swine erysipelas were reported. There were two cases of equine mange and three outbreaks of swine fever. The record of abattoir traffic is given with the price variations throughout the year.

(2) This section is most detailed and concerns the inspection of food including meat, poultry, game, fish, molluscs, crustaceans, eggs and milk. Comparative statistics for a varying number of years are given throughout the report for all important items. These show that there has been a gradual increase in the amount of meat prepared in Paris since 1930 with a corresponding decrease in poultry and game. Unusual foods (bear meat, a large quantity of venison and one mouflon) were sold in the poultry market. The percentage of rejected eggs was higher for the home produce than for imported eggs.

Investigational work on various (including imported) foodstuffs was carried out by the laboratory of the central meat market. Certain veal carcasses were proved to be reddened externally, as if treated with brine containing excessive nitrite, due to the use of excessively chlorinated water. Four cases of lymphosarcoma of the intestines of horses are described. Icterus was present in 30 per cent. of all horse carcasses, while 444 cases, diagnosed *post mortem* as equine infectious anaemia [basis of diagnosis not given] were found (0·62 per cent., of which 7·64 per cent. showed icterus). Typical lesions of the latter disease are described. Three cases of sarcomata of pigs and two cases of ossification of the inguinal canal after castration of pigs are described. A general summary in table form of all work carried out by the sanitary authority completes this part of the report.

(3) This section gives the number of milch cows in the area and the amount of milk produced. Laboratory work in connexion with milk is dealt with in part (2).

(4) This part deals with all licensed premises under the supervision of the Veterinary Sanitary Service. The cadres of the various sections and the total cost (Fr. 4,923,000) of the service are given.—C. V. WATKINS.

KENYA COLONY AND PROTECTORATE. (1934). **Report of the Deputy Director (Animal Industry) and Chief Veterinary Officer.** [BRASSEY-EDWARDS, H. H.] —*Rep. Dep. Agric. Kenya. 1933.* pp. 231-347. 58 tables.

The report covers the activities of all sections of the Animal Industry Division, dealing in turn with animal husbandry proper, executive disease control in settled areas and native reserves, veterinary research, and investigational work in collaboration with the Rowett Research Institute, Aberdeen at the Government Farm, Naivasha.

Under the heading " Administrative and Executive " an account is given of the development of the livestock industry during the year under review.

As regards the dairying industry, the production of butter was less than that of the previous year, but still remained higher than in 1931. The fall in production is attributed to a continuance of drought conditions following upon the locust infestations of the previous year ; given good climatic conditions, production may be expected to recover during 1934. The total export of butter amounted to 705,047 lb. Dairying methods are being taught to natives at the veterinary training centres, of which there are now five in existence ; in certain reserves large quantities of cream and ghee are being produced in field dairies that are under close supervision of the department. Trial consignments of ghee from native reserves have been forwarded to the Indian, Zanzibar and London markets.

Educational propaganda on the subject of shade-drying of hides continues to effect improvement in the quality of the hides, and prices generally rose during the year.

A brief account is given of an experiment on the value of 177 head of native scrub stock for conversion into by-products at the by-products plant of the municipality of Nairobi. Fertilizer produced in this manner should find a ready market in the colony, and it is suggested that a by-products plant should be erected to drain surplus scrub stock from certain of the pastoral reserves lying to the north-east and south-west of Nairobi.

DISEASE CONTROL.

On this subject, it is remarked that the practical application of disease control measures has lagged considerably behind research. This is largely attributed to difficulties created by the present financial position.

RINDERPEST.—In the settled areas, the number of outbreaks decreased from 61 in 1932 to 35 in 1933. The rinderpest position during the year has been helped by large-scale inoculations carried out among squatter stock during the previous year. Outbreaks of rinderpest have been controlled by one or other of the following methods :- simultaneous inoculation with serum and virulent blood or spleen tissue virus, inactivated vaccine, or inactivated vaccine followed by spleen virus. The same methods were used to control 54 outbreaks that occurred in native reserves and native areas. A mobile rinderpest inoculation unit was in operation during nine months of the year.

EAST COAST FEVER.—Fifty-eight outbreaks occurred in the " clean " areas, of which 52 were in the northern area, five in the Molo area and one in the Limuru area. The continuance of drought conditions was responsible for the large increase in the number of fresh outbreaks in the " clean " areas. Scarcity of grazing necessitated movements of cattle which were known to involve the risk of spreading East Coast fever. This was particularly true of the northern " clean " area, where the greatest increase in the number of outbreaks was recorded. In other areas, where grazing conditions were more satisfactory, the situation was unchanged as compared with 1932.

Contagious Bovine Pleuro-Pneumonia.—There were no serious outbreaks in the settled areas and an attempt is being made to control the disease in the infected pastoral reserves of the north.

Rabies.—This disease has presented considerable difficulty as a veterinary police problem owing to the fact that, in Kenya, it is largely spread by jackals. During the year, 22 cases were confirmed at the laboratory : 7 in dogs, 14 in jackals and 1 in a cow. In all seven cases that occurred in dogs, and in the infected bovine, infection could be traced to the bites of rabid jackals. There has been some extension of the infected territory, but the incidence of the disease has been greatly reduced in the originally infected area by destruction of uncontrolled and stray dogs and the destruction of jackals by poison-baiting.

Sterility.—Reference is made to two forms of sterility, one of which is an insufficiency type characterized by absence of oestrum. Observations by Anderson on the duration of oestrum in zebu cattle are included in the report. He found that the period of oestrum is generally considerably shorter in zebu cattle than in European breeds. In 40 per cent. of cases the period lasts less than 69 minutes. An appreciable variation in average monthly duration was also noted ; oestrum was longest in July, October, January and February. Concurrently with these observations on oestrum, pasture analyses were undertaken by Linton at the Royal (Dick) Veterinary College, Edinburgh, and the results of the complete investigation will be published at a later date.—R. Daubney.

Kenya Colony and Protectorate. (1934). **Report of the Chief Veterinary Research Officer.** [Daubney, R. J.]—*Rep. Dep. Agric. Kenya. 1933.* pp. 348-381. 5 tables. [3 refs.]

This report includes sections devoted to staff and administration, laboratory products, diagnosis and research. The post of Assistant Chief Veterinary Research Officer remained unfilled throughout the year. The hope is expressed that this loss to the service of a senior research officer will be only temporary.

6,509 slides and specimens were examined in routine diagnosis and, of the laboratory products, 137,525 × 50 c.c. units of anti-rinderpest serum, 26,789 courses of rinderpest vaccine and 132,845 doses of pleuro-pneumonia vaccine were prepared and issued.

The report on research work carried out during the year includes references to rinderpest, Nairobi sheep disease, blue tongue in cattle, horse-sickness, bovine " snotsiekte " (malignant catarrh), rabies, contagious bovine pleuro-pneumonia, contagious abortion, haemorrhagic septicaemia, paratyphoid in calves, East Coast fever, trypanosomiasis, fowl typhoid, *Salmonella pullorum* infection, leucaemia, roup and botulism.

A list of publications by members of the staff during the current year is appended.

Rinderpest.—The work on rinderpest is abstracted separately [see p. 326].

Nairobi Sheep Disease.—The investigation of possible vectors has been continued and successful transmission has been effected with *Amblyomma variegatum*, a new host for this virus. Infection has been proved to pass from the larva to the nymph, and infected nymphs will transmit in the adult stage. Transmission through the egg, which occurs in *Rhipicephalus appendiculatus*, has not yet been demonstrated, but this failure is in all probability due to the difficulty of synchronizing infection of the host and final engorgement of the tick [see also Daubney & Hudson – this *Bull.* **5.** 243].

Blue Tongue Virus in Cattle.—A virulent strain of blue tongue virus was recovered from two bovines which, during the course of rinderpest infection, showed nervous symptoms not unlike those of an acute purulent meningitis. Of 22 other cattle of the same batch, whose blood was tested by inoculation into sheep, only one was carrying blue tongue virus in the blood. The virus isolated from cattle was particularly high in virulence for sheep and, during the first two passages in this host, the infection was invariably fatal.

Horse-Sickness.—Some degree of attenuation is said to be recognizable at the 22nd subdural mouse passage of " O " virus and it is anticipated that, eventually, a neurovirus will be produced suitable for the vaccination of horses.

" Snotsiekte " (Malignant Catarrh).—Cases of a transmissible disease resembling malignant catarrh or " snotsiekte " were observed on farms whose situation precluded any possibility of contact between cattle and wildebeeste. The disease was transmitted by blood inoculation after a variable, but usually long, incubation period. An attempt was made to compare this disease with true " snotsiekte " from the Masai Reserve but, although this disease was successfully transmitted with original material, the virus failed to survive subinoculation. This investigation is to be continued.

Contagious Bovine Pleuro-Pneumonia.—Employing the " agar-embolus " technique, it was possible to reproduce the disease in cattle by intrajugular injections of thoracic lymph and first generation culture from thoracic lymph. Contact infection from naturally-contracted cases has been observed to occur after an incubation period of from 25 to 31 days [see also this *Bull.* **5.** 808].

Paratyphoid Infection in Calves.—During the year it was proved quite conclusively that the organism responsible for the paratyphoid infection of calves in Kenya is the Dublin type of *Salmonella enteritidis*, in spite of minor differences in fermentative reactions between the Kenya strains and type-strains from Europe.

Trypanosomiasis.—In an attempt to devise a simple diagnostic test for the detection of *T. congolense* infection, use has been made of salts of various heavy metals, but nothing comparable to the mercuric chloride test for the diagnosis of surra has been obtained.

Tsetse Flies.—The occurrence of *Glossina swynnertoni* in Kenya has been recorded for the first time.

S. pullorum Infection.—This disease is reported for the first time in Kenya. Two outbreaks have been diagnosed and, in each case, there has been a history of recent importation of birds from Europe.—R. Daubney.

I. British Guiana. (1935). **Report of the Veterinary Division for the Year 1934.** [Bone, T.]—*Adm. Rep. Dir. Agric. Brit. Guiana, 1934.* pp. 127-129.

II. British Guiana. (1935). **Report on Animal Health for the Year 1934.** [Bone, T.]—*Ibid.* p. 36. 1 table.

I. Animal Diseases.—An outbreak of anthrax in mules was observed. " Mal de caderas " caused losses in horses in the Rupununi district. Tuberculosis was found in many cattle from the Berbice district.

It is stated that the chief drawback to the control of animal diseases is the lack of government regulations. A livestock and animal diseases bill has been drafted.

II. Livestock Census.—150,000 cattle, 2,900 horses, 1,600 mules, 6,000 donkeys, 80 buffaloes, 18,000 sheep, 9,000 goats and 14,000 pigs.—J. E.

CITY OF SALFORD [GREAT BRITAIN]. (1935). **Report Relating to the Veterinary Inspector's Department.** [ALEXANDER, A.]—*Rep. med. Offr Hlth Salford, 1934.* pp. 141-154. 2 tables.

The report gives information on a variety of subjects, from Diseases of Animals Acts to Bakehouses and Offensive Trades. In a wealth of detail concerning the milk supply, allusion is made to the high percentage of " pasteurized " milk which contains coliform organisms, due probably to contamination after pasteurization. Comment is made on the enormous increase in the amount of milk sold in bottles during the last few years and the importance of the sterilization of returned empty bottles. A bacteriological examination of 54 " cleaned " milk bottles, showed that 18 (33·3 per cent.) were dirty, emphasizing the necessity for continued supervision.

465 samples of milk were examined for tubercle bacilli ; 38 were positive, including one from a " certified " herd.

An interesting feature is a table showing the number of samples of milk obtained from various counties, and the number and percentage found to be tuberculous for the years 1923 to 1934.—E. BROWN.

UNITED STATES OF AMERICA, OHIO. (1934). **Report of Department of Animal Industry. [Ohio Agricultural Experiment Station (1932-33)].**—*Bull. Ohio agric. Exp. Sta.* No. 532. pp. 67-76. 2 tables.

BOVINE CONTAGIOUS ABORTION.—Experiments were carried out to determine whether the udder can act as a reservour for *Brucella abortus* from which the infection may be spread. The udders were removed from eight non-reacting calves when four to five months old. When mature these animals conceived readily. Six were experimentally infected and aborted. Two that were not infected delivered normal calves and were kept as controls. About four months later these eight heifers were put in contact with six negative heifers of breeding age. All the animals were served and, except one of the negative heifers which failed to conceive, all the animals conceived normally. At no time did any of the non-infected animals show titres of more than partial agglutination at 1 : 25. [This is evidently intended as negative evidence that the udder alone acts as a reservoir for infection : see, however, DOYLE – this *Bull.* **6.** 109].

PIG DISEASE.—A serum possessing antibodies for both swine erysipelas and swine fever was prepared by hyperimmunization methods.

POULTRY DISEASE.—Further experiments tend to confirm the previous observation that immunity conferred to fowls by pigeon pox vaccine was not so complete as that resulting from fowl pox vaccine.

The value of nicotine sulphate in the control of infestation with ascarids and coccidia, and pyrethrum as an anthelmintic for *Ascaridia lineata* is being determined. Range paralysis is being studied.

Oesophagostomum columbianum.—Bact. coli was found to be a suitable food for these larvae.—F. H. MANLEY.

—. (1935). **Report of the Committee on Legislation [Amer. Vet. Med. Ass.]**—*J. Amer. vet. med. Ass.* **87.** 429.

It is pointed out that President ROOSEVELT signed an act of Congress placing the Veterinary Corps of the Army on the same basis as the Medical and Dental Corps as regards rank and promotion. In view of this recognition the Committee urges the members of the veterinary profession to support the Veterinary Reserve Corps.—BRENNAN DEVINE.

BOOK REVIEWS.

CHALMERS, C. H. [B.Sc. (Edin.), N.D.A., Leeds University]. (1935). **Bacteria in Relation to the Milk Supply. A Practical Guide for the Commercial Bacteriologist.** pp. xii+192. 16 figs. on 4 plates, 31 text figs., 1 table. London : Edward Arnold Co. [8vo] [6s.]

The foreword, written by Dr A. T. R. MATTICK, stresses the need for instruction in elementary hygiene and in the sciences, particularly microbiology, concerning milk and the control of our milk supply. This book is an attempt to supply this instruction in a suitable form for the commercial bacteriologist and others interested in the routine examination of milk.

Part I deals with the routine examination of milk and water and with the causes of taints and abnormal conditions in milk. The isolation and identification of organisms from milk and the control of a dairy plant are also dealt with.

Part II deals with general bacteriological technique, whilst there are appendices giving the composition of culture media, stains and chemical agents.

The author states that the book may be of use as a primer for those approaching the subject for the first time, such as students of agriculture and dairy husbandry. For these and certain others it will no doubt prove a useful, cheap book, but it is of less value to the trained medical or veterinary bacteriologist, who is mainly interested in pathogenic bacteria. There are many statements open to controversy in the section dealing with such pathogens ; for example, the necessity for sub-culturing *Streptococcus agalactiae* (*mastitidis*) every seventh day. The estimate, that only about 10 per cent. of the fatal cases of tuberculosis in children under five years of age is due to the bovine type, is also open to criticism. Notwithstanding, it should prove a useful aid for those for whom the book is written.

—R. LOVELL.

BENESCH, F. [Professor der Geburtshilfe an der Tierärztlichen Hochschule in Wien, Vorstand der Lehrkanzel]. (1936). Die Geburtshilfe bei Rind und Pferd. **[Obstetrics for Cattle and Horses].** pp. 319. 135 figs. Berlin : Urban & Schwarzenberg. [2nd Edit.] [8vo] [RM.9].

In reviewing this book, there is little to add to the review of the first edition [this *Bull.* **4.** 195.], except to say that there seems to be no end to the ingenuity of veterinary obstetric specialists in the design of new embryotomes, the " pocket embryotome " of Meyer-Schlichting being probably the most valuable of the new ones of the last three years. The veterinary practitioner now has very little excuse for failure in calving and foaling cases, with modern technique and instruments.

This second edition is nearly half as big again as the first and contains 40 more figures. It is, therefore, much better value and is warmly recommended.—J. E.

BANHAM, G. A. [F.R.C.V.S.], & YOUNG, W. J. [F.R.C.V.S., D.V.S.M. (Vict.)]. (1935). **Table of Veterinary Posology and Other Information for the Use of Students and Practitioners.** pp. ix+374. Numerous tables. London : Baillière, Tindall & Cox. [6th Edit.] [8vo] [8s. 6d.]

The new edition of this well-known handbook retains the general form of the fifth edition of 1925, but has been entirely revised by the junior author and is now in conformity with the recent new editions of the British Pharmacopoeia, 1932, and the British Pharmaceutical Codex, 1934.

A table of bacterial synonyms showing the old and more familiar names and the names adopted by the Society of American Bacteriologists is also included.

Some recent advances appear to have been overlooked ; for instance, carron

oil still appears amongst the therapeutic agents for burns although such treatment is obsolete. The duration of oestrum in the mare (p. 294) could be more accurately given as from three to nine days. The French and German synonyms for swine fever (p. 344) are wrong.

This handy " mine of information " will doubtless be received with alacrity by the veterinary profession. Its value is too obvious to require demonstration. —J. E.

TURNER, C. W. [Associate Professor of Dairy Husbandry, College of Agriculture, University of Missouri]. (1933). **The Anatomy of the Mammary Gland of Domestic and Laboratory Animals.** pp. vi + 191 + 12 pp. glossary + 10 pp. index. 125 figs., 21 tables. [Numerous refs.] [Crown 4to] [Mimeographed].

The correlation of scattered descriptions with the author's own knowledge has resulted in a detailed account of the mammary glands of a number of animals. Approximately half the book concerns the udder of the cow, and the remainder comprises comparative descriptions of the mammae of representative members of the class Mammalia. The position, gross anatomy, histology, common defects, abnormalities, development, effect of age and repeated lactations, and statistical factors are all discussed, and a detailed description of the blood, lymph and nerve supplies is also given.

A general outline of the histology of the component tissues is included in a special chapter, as is also a consideration of the general principles of the mechanism of secreting glands. The Mammalia are classified, and the mammae of Monotremata, Marsupialia, and Monodelphia are considered ; of the last-named division the goat, the ewe, the sow, the mare, the bitch and the cat receive detailed attention and their mammae are compared with those of the cow. The book is very clearly and simply written, and is evidently intended for the agriculturalist as well as the biological student ; a glossary of 200 to 300 words explains technical terms. It is a pity that it is only mimeographed and, although the figures are plentiful and quite good, they have unfortunately been left un-numbered and their identification from the text is not always clear. Books of this nature, grouping the knowledge of particular organs, should be of great value to the pathological as well as the physiological student, as standard text-books frequently lack a wide comparative range. A bibliography appears at the end of each chapter and a complete author index at the end of the book.—NORMAN HOLE.